

The Impact of a Water-Imposed Interruption of Growth in the Las Vegas Region

Prepared for
Las Vegas Valley Water District

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Preface

This study has been accomplished under a contract with the Las Vegas Valley Water District by William T. White Associates in conjunction with the Center for Business and Economic Research at the University of Nevada, Las Vegas. The authors wish to acknowledge the valuable assistance provided by George L. Fussell, Diana McGrail, Kristin J. Pryor, Paul Ruth, Keith Sargent, Tina Bejrananda, and Joseph A. Volpi, students all of economics who managed much of the data and literature search supporting this study. Peggy Scroggins, Rennae Daneshvary, and Beverly Crane provided invaluable editorial assistance. The authors, however, remain solely responsible for the conclusions and all other parts of this study, which has been accomplished independently of guidance, other than that referring to scope of work, from the Las Vegas Valley Water District. We are prepared to provide any needed or desired further explanation of our data sources, models, methods and conclusions.

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A Study of the Impact of a Water-Imposed Cessation of Growth
in the Las Vegas Region

Introduction

This study is prompted by the expectation that water supplies for the Las Vegas Valley, both those used currently and those additional quantities available from existing sources, cannot sustain significant further economic growth of the region beyond the year 2006.

There are five parts to this study. Part I uses a regional econometric (REMI) model to project the growth of the Las Vegas region to natural maturity, essentially unconstrained by an overriding water shortage.

Part II is a reinforcing cross-section analysis of metropolitan areas in the United States to learn the most common natural growth patterns and those that have produced a good quality of life with a minimum of major local disturbances. This analysis gives attention to employment, population, income, and other key economic and social indicators. We give special attention to events in cities that are nearer to or at levels of maturity still many years away for Las Vegas.

Part III of this study looks at the performance of sectors of the Las Vegas economy between 1970 and 1989. In particular, we identify those sectors of the Las Vegas economy that are sensitive to variations in growth, particularly during the 1979 to 1983 recession period.

Part IV examines the impact of an unrelieved water shortage after 2006 on the Las Vegas socioeconomic future, giving special attention to the fraction of employment that depends on historically high growth rates to predict the impact of rapid decline of that employment. In Part IV, we employ the depth and power of the REMI model to portray the consequences for Las Vegas of a sharp drop in growth after 2006. In this part, we simulate a sixty percent reduction in construction employment, based on the experience of other cities investigated in Part II. We trace this disruption of growth through reduced employment, population, output and income. We measure the effect of the water shortage by comparing the values of economic variables with a water shortage, with a control forecast produced under the assumption of adequate water supplies. Part IV also includes a partial analysis of a Las Vegas water shortage on rural Nevada and on the state of Nevada as a whole.

Part V investigates the impact on rural areas of construction and operation of a system bringing water from outlying areas to the Las Vegas region. We are aware that final planning for such a system is not yet completed. We have used a reasonable set of expenditures, locations, and periods that can be expected to occur. These simulations provide a plausible estimate of the effects of both the construction and operation of a water delivery system on employment and income in those rural areas. As more definite information emerges, appropriate changes can readily be made and new analysis of impacts can be quickly provided.

The reader should understand that in forecasting the consequences of no new water sources after 2006, we have allowed for optimum adjustments to shocks by business leaders, government authority, and the community as a whole. This assumed efficient behavior is the basis for renewed growth of population, employment, and income shown after the 2006 - 2015 period. It is possible, however, that the deep and lasting shock of permanent denial of new water after 2006 would largely defeat normal adjustments. In this situation, population and employment could stagnate or even decline, perhaps indefinitely, particularly if

the community has no reason to expect any future improvement in the water situation. We do not expect this stagnation or decline on a permanent basis, but suggest that this possibility of their occurrence be recognized as a worst-case scenario.

It is to be expected that, even in the best-case scenario, unemployment will initially increase rapidly (as high as 12.5 percent) with the cutbacks in 2006. However, a particular economic region reacts rapidly to increased unemployment through outmigrations, withdrawals from or delayed entry into the labor force, or early retirement. The negative impacts of the cutbacks after 2006 will therefore be more in the form of the economic and social costs of unwanted relocations, forced changes in plans and careers, and other undesirable changes rather than as persistently high and predictable unemployment rates.

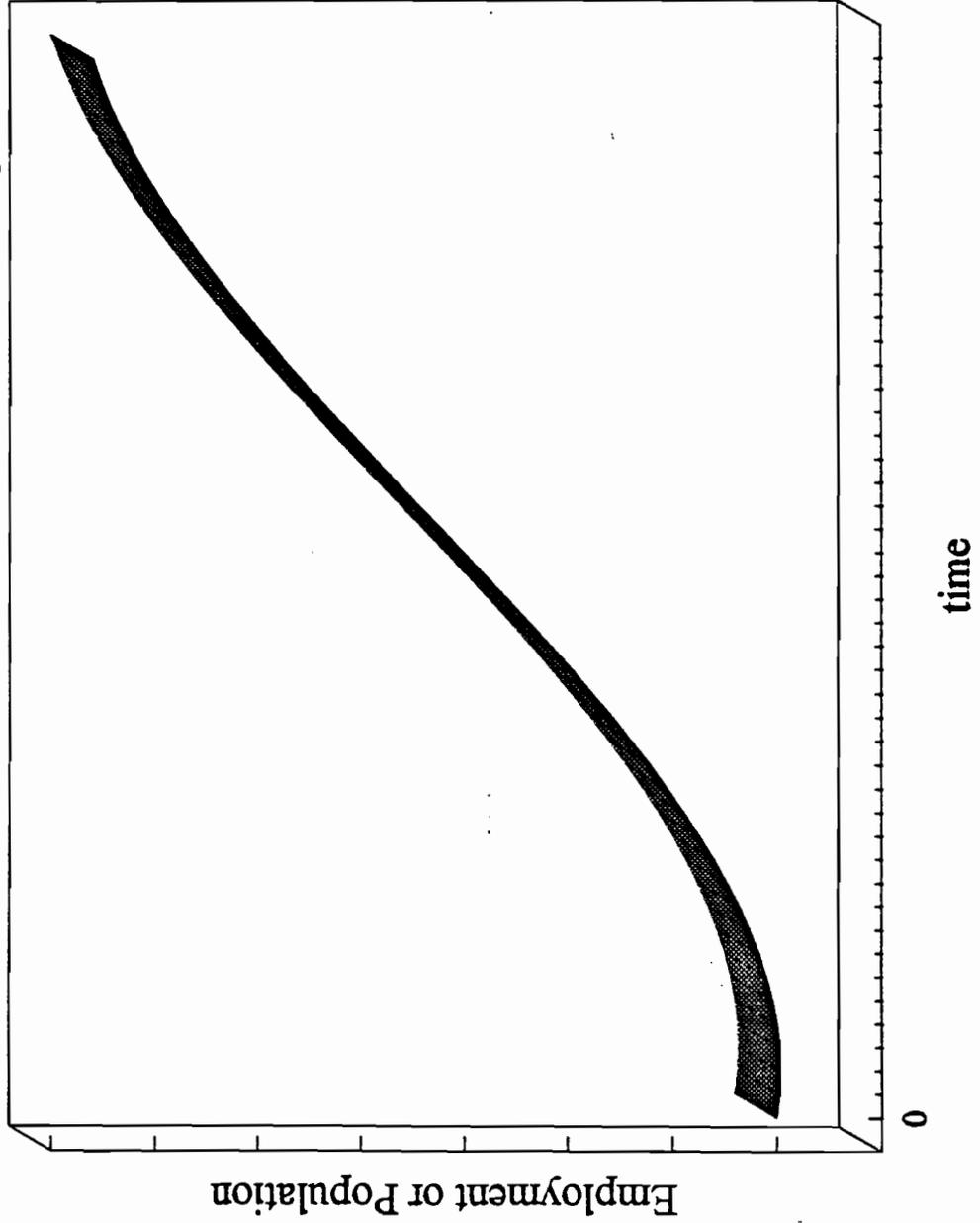
The underlying principle of this study is that, with exceptions from time to time and from place to place because of recessions or special events, cities that avoid major problems and provide a good quality of life generally follow a common growth pattern from growth to maturation. This pattern evolves with slow growth in early stages, followed by periods in which both growth increments and growth rates increase, followed in turn by continued increases in growth increments but declines in percentage rates of growth, and then finally, at maturation, achieving essentially stable rates of growth at or near the national growth rate. The process usually extends over many decades and typically encounters many interruptions, some slowing growth and some accelerating it, but in the end following the basic pattern described. Figure Intro 1 shows this pattern in terms of populations of a hypothetical city over time.

An important part of the process of city growth, as described above, is that, despite unanticipated interruptions, the basic character of the process and its gradual nature come to be understood by decision-makers, public and private

alike, permitting the development of infrastructure and service patterns without destructive surprises. A second major part of the process is that economically rational action is possible in the sense that, if only a few factors limit growth, the benefits of removing those constraints will justify the higher costs involved. Ultimately, as each constraint is faced and overcome, costs of overcoming future constraints increase until any growth faster than the national rate of growth is just too costly. In economists' terms, overcoming barriers to growth is subject to diminishing returns (increasing costs). When the marginal cost of removing accumulated impediments exceeds the marginal benefit of growth, the city has achieved economic maturity. Artificial limitations on factors conducive to economic growth, especially when the costs of such factors are less than their benefits, have two strongly negative results. First, such limitations prevent the allocation of resources by price and, with that, the movement of resources to their highest and best uses. Second, the arbitrary nature of the limitations makes them unpredictable in amount and duration, which increases uncertainty and fosters excessive caution by public and private decision-makers.

The remainder of this study is a factual substantiation of the argument that the water necessary to the well-rounded maturation of the Las Vegas region should be made available and used as long as the costs of doing so are no greater than the benefits therefrom. Our study will show that this point probably will be reached somewhat below the 250,000 acre-feet per year addition now planned. Nevertheless, our analysis would support a structure of laws and actions that would cause that or even a greater amount to be made available if growth exceeds expectations.

Figure Intro 1
Typical Growth of a Mature City



Part I

Projection of Las Valley Growth to Natural Maturation

Understanding the REMI model:

The first step in predicting the growth path of the Las Vegas area under normal conditions is the calibration of the control forecast of the Nevada Regional Econometric model. This model was originally designed by Regional Economic Models, Incorporated (REMI). Therefore, the model will be called the REMI model. A control forecast was calibrated from 1989¹ through 2035. After estimating the forecasts, we extracted six key variables from the model: state and local government employment, total employment, population, disposable personal income, gross regional product, and per capita income. The latter three variables were measured in 1990 dollars.

We arrayed the selected variables, which we used to generate estimated growth paths. We discovered that the forecasts consistently grew at a slower rate than the historical data had grown. To verify this observation, we regressed each variable against a time trend and found significantly slower rates of growth for the forecasts of total employment and population. Once one understands the structure of the REMI model, the reason for the underprediction soon becomes apparent. Although the equations in the model are sometimes complex, the structure of the model itself is beautifully simple. REMI uses historical data on the region(s) of interest (included in Nevada are the counties of Clark, Nye, Lincoln, the Washoe-Carson City area, and the rest of the state) and the United States' economy to estimate an input-output table. As the national economy grows, as predicted by the econometric model of the Bureau of Labor Statistics, the local

¹ In the version of the model used, the historical data run from 1969 through 1988, making 1989 the first forecast year.

economy responds. The national economic variables determine the local economy variables. As long as the historical relation between regional and national variables remains consistent, the forecast of the national economy can be translated into a forecast of the local economy.

The designers of the REMI model understand that there can be many changes in the local economy that do not spring directly from changes in the national economy. A strength of the REMI model is that it allows forecasters to simulate these autonomous local changes and forecast the effects of these changes. In the Las Vegas economy there are three major forces that are causing growth in population and income to outpace the national rate.

First are the planned and actual increases in the capacity of the tourist sector of the economy. Through both the construction of new casinos and the expansion of existing facilities, the capacity of the casino/hospitality sector is currently peaking at a ten percent annual rate. This peak growth implies that the model underpredicts construction employment in the short run and service employment in the tourist sector in the long run.

The second major cause of rapid growth in the Las Vegas is the migration of retired persons, particularly those attracted from southern California by the lower housing cost and generally lower cost of living than in southern California. The model has underestimated construction employment, as houses must be constructed for these migrating seniors. The model also underestimates employment in the retail and service sectors, as seniors bring pension and social security income with them and increase aggregate consumer expenditure.

The third cause of rapid growth in Las Vegas is the rapid growth itself. As employment opportunities in construction, services, and retail trade expand, people migrate to Las Vegas in search of these jobs. These workers who build

the houses must themselves find housing, either in apartments or single-family dwellings. As population expands, so does government employment and the requirements for infrastructure: schools, roads, and transportation facilities.

Accordingly, we decided that, before investigating the impact of a water-shortage-induced growth limitation on the Las Vegas economy, it was necessary to incorporate these three sources of growth into the REMI model. The control forecasts listed in Tables 1.1 through 1.6 and Figures 1.1.1 through 1.6.3 incorporate these modifications, which we will now discuss in detail.

Revising the Econometric Forecasts:

Comparing estimates of the senior citizen population, compiled for the *1990 Las Vegas Perspective* by the UNLV Center for Business and Economic Research, with the REMI model forecasts for 1990, we found that REMI was underestimating the growth in the senior population by 8,000 persons, or 4,000 households, per year. In Chart 1, we summarize the assumptions on senior migration that we incorporated into the REMI forecast. We assumed that the rate of senior migration into the Las Vegas Valley would continue at 8,400 people per year to the year 2015, then fall to 4,200 for the period 2015 to 2025, and would decrease to 2,100 from 2025 onward.

Median household disposable income for Las Vegas seniors is \$24,153 per year²; accordingly, we increased consumption expenditures by this amount each year. From *The Economic Report of the President*³ we obtained the breakdown of consumer expenditures for broad categories (e.g., food, medical care, housing, personal services) and increased the expenditures in each category by five percent

²*Las Vegas Perspective, 1990*, p. 15.

³Table C-14, *Personal Consumption Expenditures, 1940-1989*, from page 310 of the 1990 Report.

per year to allow for inflation⁴.

We also increased the housing stock by four thousand units per year to accommodate the migrating seniors. As shown in Chart 2, we assumed that half these structures would be single-family dwellings costing \$100,000 each. The other half of the dwellings were assumed to be multiple-unit (apartment) dwellings, costing \$50,000 per unit. We assumed the number of units constructed for seniors would decrease to 2,000 between 1996 and 2006. After 2006, the model itself forecast the appropriate housing-stock increase for seniors, assuming that senior migration is correctly forecast by the model for that period.

According to the Las Vegas Convention and Visitors Authority, hotel, motel, and casino construction are increasing at a ten percent annual rate. The plans filed with the Authority imply that this rapid increase in the hospitality industry is likely to increase for ten years. If, as is likely, some planned hotels are not constructed, it is likely that other, yet unplanned, new resorts will take their place.

As shown in Chart 3, we assumed that hotel/motel construction would increase at five percent per year in real terms through 1995. This rate is half that forecast by the Convention and Visitors Authority, reflecting a conservative methodology on our part. We assumed that expenditure on hotel construction would decline by five percent per year from 1996 through 2016. From the year 2017 through the year 2035, we assumed annual declines in hotel construction expenditures of five percent per year (real declines of ten percent per year). Each hotel/motel room was expected to cost \$15,000 in 1990 dollars.

⁴ While autonomous expenditure categories were entered into the model in nominal terms (requiring an assumption about the rate of inflation), the output of the model is in constant dollars.

Once hotel and casino capacity expands, there will be increased demand for labor to staff these facilities. The rule of thumb for casino staffing is 1.5 workers per room. Because we expect that new construction will reduce the occupancy rates for older hotels, we used the conservative figure of 1.3 workers per room.

Finally, we made assumptions concerning infrastructure projects. As shown in Chart 4, we added expenditures for infrastructure as follows: (1) New streets and highways -- \$100 million in 1990 dollars from 1990 through 2015, then declining by ten percent per year to reflect natural maturation. (2) New educational buildings -- similar to streets and highways -- \$100 million in 1990 dollars per year from 1990 to 2000, then \$50 million per year from 2001 to 2035. (3) We assumed that public transportation infrastructure would be built between 1994 and 1997, with annual expenditures of \$167 million per year in 1990 dollars. We introduced these expenditures into the model as new railroad expenditures. (4) We assumed a ten-year expansion of the airport, with an expenditure of \$30 million per year in 1990 dollars, from 1990 through the year 2000. (5) Planned urban transportation expenditures of \$50 million per year are assumed for the near future (1992 - 1993).

Forecasts of Las Vegas Future Growth Under Natural Maturation:

The series of tables for Part I, and the accompanying set of figures predict the patterns of Las Vegas growth in the near-term and long-term futures, assuming that there are not artificial impediments to that growth, such as water-shortage-induced growth restrictions. Table 1.1 is the control forecast for Clark County, showing projected employment, population, and gross regional product from 1990 through the year 2035. Without growth impediments, we predict that employment would grow from 451,659 in 1990 to 1,083,021 in 2035. Employ-

ment growth and senior migration would generate population increases from 820,465 in 1990 to 1,898,178 in 2035. Senior migration and the aging of the population would increase the population to employment ratio from 1.7 in 1990 to 2.1 in 2035. Figure 1.1.1 depicts the trends in employment and population.

Employment, population, and productivity growth would combine to increase total output and income generated in Clark County, as shown in Figure 1.1.2. Gross regional product – the market value of all goods and services produced in Clark County – would increase from \$20 to \$70 billion (measured in 1990 dollars) between 1990 and 2035. This growth implies an increase in output per worker from \$44,538 in 1990 to \$64,972 in 2035. This higher output portends enhanced income. If the Las Vegas economy grows to normal maturation, personal disposable income will increase from \$12.5 billion in 1990 to \$56.7 billion in 2035. After adjusting for population changes, this means an increase in per capita disposable income from \$15,261 in 1990 to \$29,851 by 2035 (see Figure 1.1.3).

Tables 1.2 through 1.4 depict control forecasts for Nye County, Lincoln County, and rural Nevada (all counties except Clark, Washoe, and Carson City). Table 1.4 includes figures for Nye, Lincoln, and White Pine Counties.⁵ In Table 1.4 we find that total employment in rural Nevada would increase by nearly seventy percent between 1990 and 2035, while population would approximately double. Gross regional product and personal disposable income would increase approximately threefold, implying an increase in per capita income from \$14,281 in 1990 to \$24,026 in 2035, measured in 1990 dollars.

⁵We are interested here in the impacts on Nye, Lincoln, and White Pine Counties. The Nevada State Regional Model does not contain a separate region for White Pine County; that county is aggregated with the other rural counties in the "rest of the state" component of the model. For a more complete view of the rural areas, Nye and Lincoln Counties were added into the "rest of the state" component. For this reason, the figures in Tables 1.1 through 1.5 do not sum to the state total. The state total is the sum of Table 1.1, Table 1.4, and Table 1.5.

In Table 1.5 we find that employment in the Reno-Carson City area would approximately double from 207,890 in 1990 to 410,713 in 2035, with a corresponding increase in population from 305,028 to 757,276. Real gross regional product would triple while personal disposable income would quadruple. This pattern suggests an increase in per capita income from \$17,699 in 1990 to \$30,002 in 2035.

Finally, Table 1.6 forecasts the growth of the state of Nevada, under the assumption that the Clark County economy (and the economies of other regions in the state) grows uninterrupted to natural maturity. Led by Clark County, total state employment should increase from 763,185 in 1990 (with Clark County employment at sixty percent of the state) to 1,668,527 in 2035 (when Clark County will make up sixty-six percent of the state employment). Population should increase from 1.28 million in 1990 to nearly three million in 2035.

The dollar value of output – real gross regional product – should increase from \$33.860 billion to \$113.1 billion over the 1990 to 2035 period. Personal disposable income, measured in 1990 dollars, should grow from \$20 billion to \$86.9 billion. With income growth outpacing population growth, average income per person should increase by eighty-six percent, from \$15,720 in 1990 to \$29,274 in 2035.

Conclusions

Our control forecast for the Las Vegas economy, assured of adequate, if more expensive, water supplies and without other noneconomic limitations on its natural evolution, has these elements:

(1) There will be continued rapid growth at least midway through the 1990s. Economic growth will slow in the late 1990s but remain at rates well above the national average at least until the year 2020, plus or minus five years. Within the period 2015 to 2025, the Las Vegas economy will reach mature growth at national average of about two percent per year. Except in response to national business cycles and other occasional shocks, the economy should maintain the national average growth rate in the years after 2025. The process involved in this pattern will be gradual and sufficiently recognizable to allow orderly adaptations in employment, migration, and those public and private decisions necessary to a high quality of life in the Las Vegas region.

(2) The economies of rural Nevada and the Reno-Carson City area depend on the health of the Nevada economy. The Reno area may already have achieved the stage of natural maturation. If this is so, the model is overpredicting growth for this area, since predicted growth is based on historical trends. Nothing in the REMI model predicts an independent stimulus to the growth of rural Nevada. Therefore, as goes the Las Vegas economy, so goes the economy of Nevada. As will be shown in Part IV, the impact of a water-shortage-induced interruption of growth in the Las Vegas region will have repercussions throughout the state of Nevada.

(3) The control forecast and the logic behind it do not present a picture of unlimited growth without consideration of impacts of growth on the environment. Rather, the forecast shows a pattern of moderating growth fully consistent with,

and in fact enabling, governmental and private programs which will protect and improve the environment and the quality of life in Las Vegas and in Nevada as a whole.

Chart 1

Retired Senior Citizens Population Assumptions

- Current Senior Citizen Migration
 - 4,200 households per year
 - 1.99 people per household
- Allocations (by age and sex)
 - 3 phase assumptions
 - 1989 to 2015: 8,400 people per year
 - 2015 to 2025: 4,200 people per year
 - 2025 to 2035: 2,100 people per year
 - 2 age brackets
- Senior expenditures
 - \$24,153 annual income per household
 - 5% annual inflation rate

Chart 2

Housing

Autonomous Population Growth

- Allocation
 - 50% single family
 - 50% multi-family
- Costs
 - \$100,000 per single family home
 - \$50,000 per multi-family unit
- Causes of Autonomous Housing Growth
 - Hotel Operations
 - Seniors
 - Housing Construction
 - Warehousing
 - Infrastructure Construction

Chart 3

Hotel/Motel Construction

Growth Assumptions

- Projected Growth
 - 5% 1987 through 1995
 - Decreasing growth rate 1996 through 2016
 - Maturation (2017 - 2035)
- Projected Employment Increase per Hotel Room
 - 1.3 Employees
 - (Includes Hotel and Casino Employment)
- Projected Investment
 - \$15,000 per Hotel Room (5% inflation rate)

Chart 4

Infrastructure

Expenditure Assumptions

- Schools
 - \$100 million per year, 1990-2000
 - \$50 million per year, 2001-2035
 - 5% inflation factor
- Roads
 - \$100 million per year, 1990-2015
 - Decreasing by 10% per year after 2015
 - 5% inflation factor
- Transportation
 - Urban \$50 million per year for 1992, 1993
 - Public Transportation \$167 million per year, 1994-1997
 - Airport \$30 million per year, 1990-2000

Table 1.1
Control Forecast
Clark County

Year	Thousands of People			Billions of 1990 Dollars		1990 Dollars
	Government Employment	Total Employment	Population	Personal Disposable Income	Gross Regional Product	Per Capita Income
1990	52.272	451.659	820.465	\$12.521	\$20.153	\$15,261
1991	54.048	469.618	853.599	\$13.397	\$21.074	\$15,695
1992	55.832	484.457	886.732	\$14.165	\$21.718	\$15,974
1993	58.137	501.750	919.866	\$15.117	\$22.703	\$16,434
1994	60.172	516.904	952.999	\$15.957	\$23.705	\$16,744
1995	61.693	543.658	986.133	\$16.689	\$25.470	\$16,924
1996	63.422	574.501	1,019.266	\$17.616	\$27.170	\$17,283
1997	65.791	595.560	1,052.400	\$18.292	\$28.374	\$17,381
1998	68.203	611.824	1,085.533	\$19.319	\$29.454	\$17,797
1999	70.509	636.094	1,118.667	\$20.376	\$31.155	\$18,215
2000	72.272	653.955	1,151.800	\$20.635	\$32.400	\$17,915
2001	74.218	673.382	1,175.980	\$21.550	\$33.566	\$18,325
2002	76.354	693.466	1,200.160	\$22.535	\$34.809	\$18,777
2003	78.398	712.442	1,224.340	\$23.529	\$36.049	\$19,218
2004	80.391	732.156	1,248.520	\$24.578	\$37.367	\$19,686
2005	82.419	752.731	1,272.700	\$25.665	\$38.760	\$20,166
2006	84.596	773.143	1,296.880	\$26.759	\$40.190	\$20,633
2007	86.934	791.013	1,321.060	\$27.814	\$41.499	\$21,054
2008	89.311	806.727	1,345.240	\$28.853	\$42.723	\$21,448
2009	91.731	822.582	1,369.420	\$29.908	\$43.977	\$21,840
2010	94.206	838.444	1,393.600	\$30.986	\$45.250	\$22,235
2011	96.270	855.154	1,414.440	\$32.307	\$46.549	\$22,841
2012	98.318	870.161	1,435.280	\$33.074	\$47.777	\$23,044
2013	100.364	885.132	1,456.120	\$34.120	\$49.010	\$23,432
2014	102.440	900.089	1,476.960	\$35.185	\$50.251	\$23,823
2015	104.419	913.047	1,497.800	\$36.220	\$51.403	\$24,182
2016	106.343	924.024	1,518.640	\$37.218	\$52.342	\$24,507
2017	108.283	937.124	1,539.480	\$38.273	\$53.519	\$24,861
2018	110.264	950.113	1,560.320	\$39.351	\$54.696	\$25,220
2019	112.226	961.450	1,581.160	\$40.424	\$55.808	\$25,566
2020	114.143	971.146	1,602.000	\$41.487	\$56.853	\$25,897
2021	114.577	971.336	1,622.580	\$42.048	\$57.202	\$25,914
2022	114.874	976.220	1,643.161	\$42.632	\$57.875	\$25,945
2023	116.461	984.384	1,663.000	\$43.575	\$58.808	\$26,203
2024	118.111	994.089	1,684.322	\$44.557	\$59.808	\$26,454
2025	119.743	1,002.101	1,704.903	\$45.533	\$60.727	\$26,707
2026	121.403	1,011.632	1,725.483	\$46.544	\$61.722	\$26,974
2027	123.107	1,020.926	1,746.064	\$47.578	\$62.708	\$27,249
2028	124.808	1,028.557	1,766.644	\$48.615	\$63.624	\$27,518
2029	126.529	1,037.459	1,787.224	\$49.683	\$64.603	\$27,799
2030	128.262	1,044.532	1,807.805	\$50.753	\$65.500	\$28,074
2031	130.037	1,052.948	1,824.864	\$51.863	\$66.469	\$28,420
2032	131.886	1,061.113	1,842.426	\$53.008	\$67.433	\$28,771
2033	133.765	1,067.543	1,859.890	\$54.166	\$68.327	\$29,123
2034	135.758	1,075.388	1,878.419	\$55.387	\$69.304	\$29,486
2035	137.879	1,083.021	1,898.178	\$56.663	\$70.285	\$29,851

Figure 1.1.1
Total Employment
Clark County (Control)

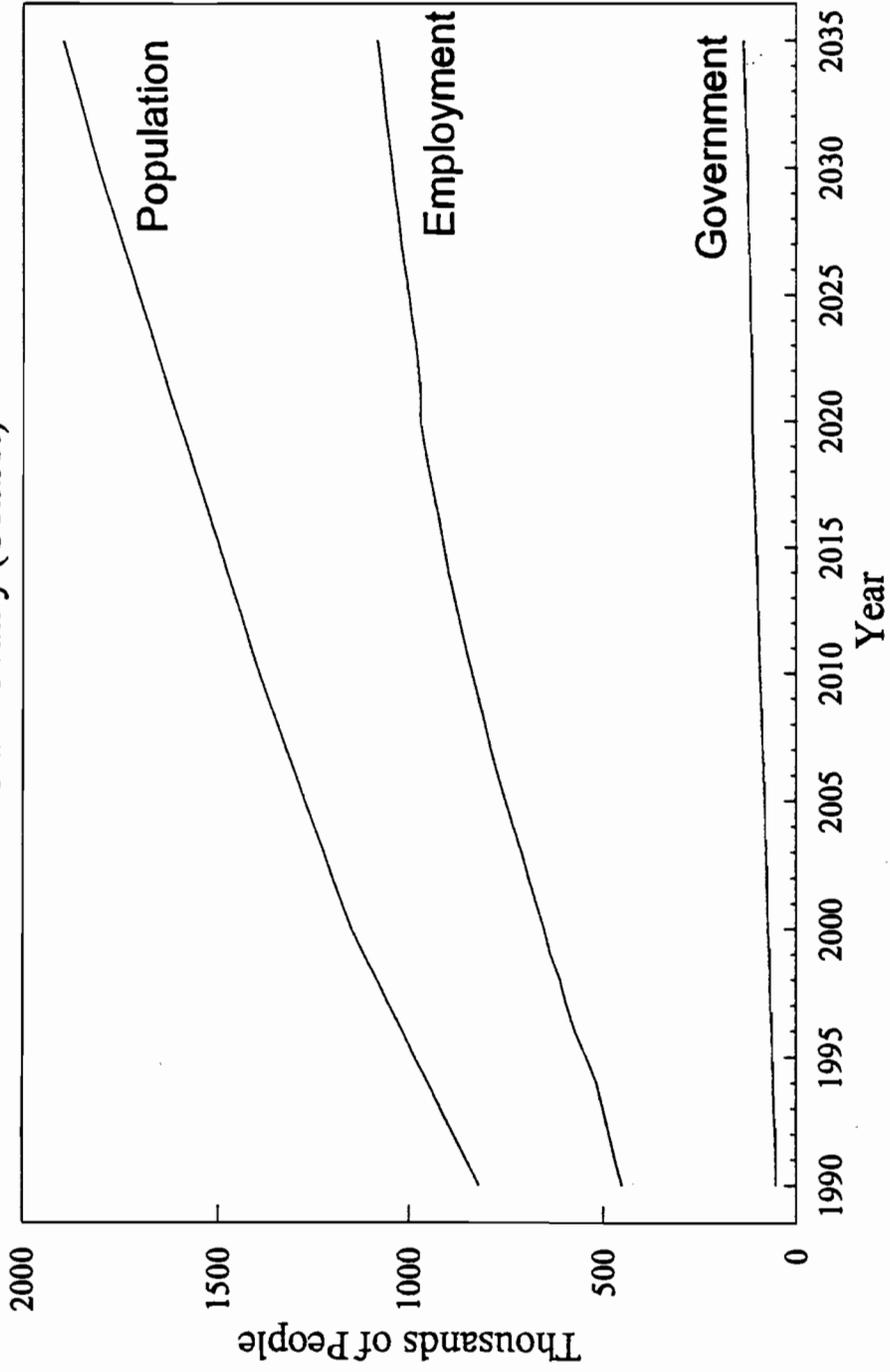


Figure 1.1.2
Income and Gross Regional Product
Clark County (Control)

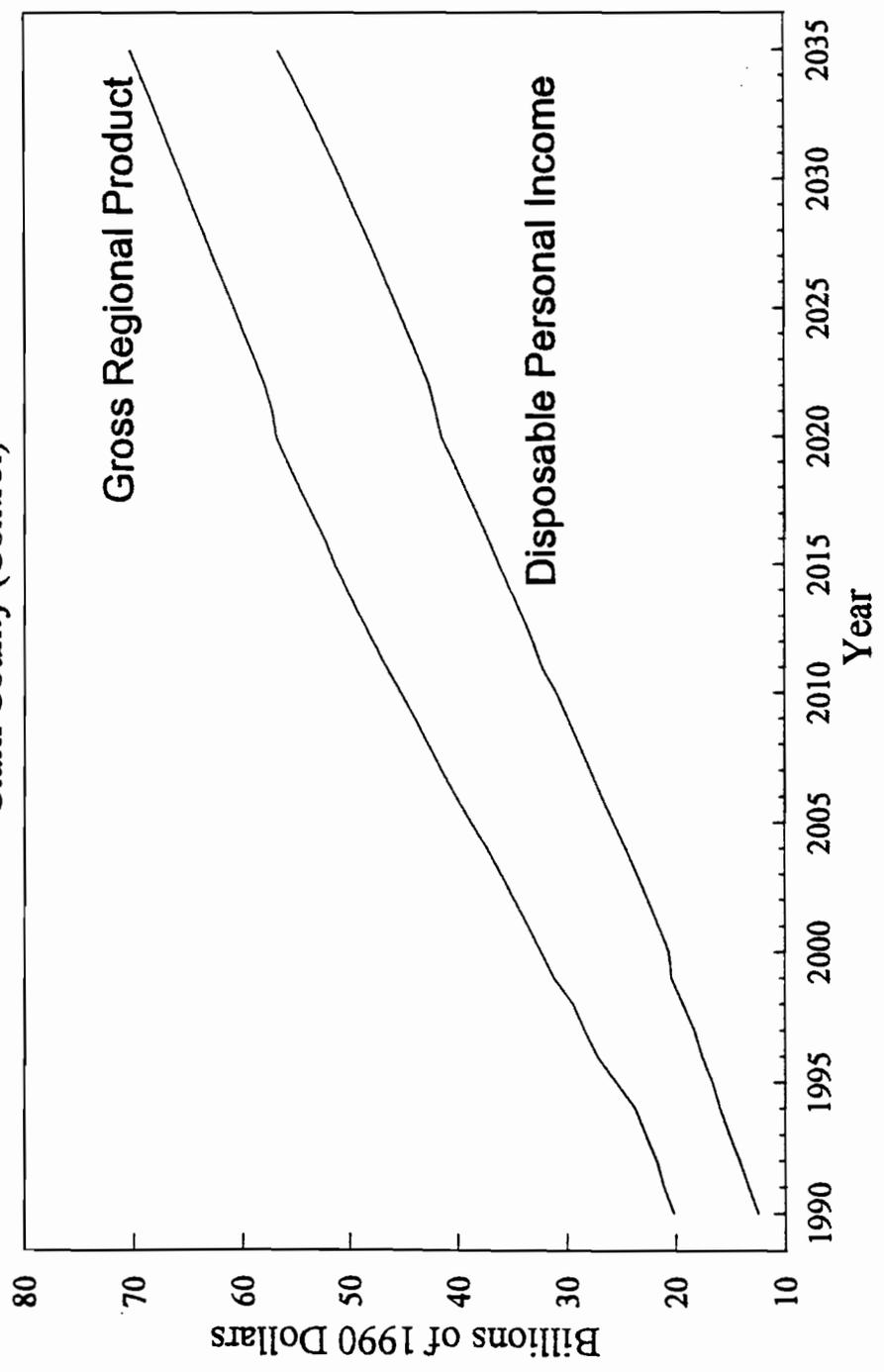
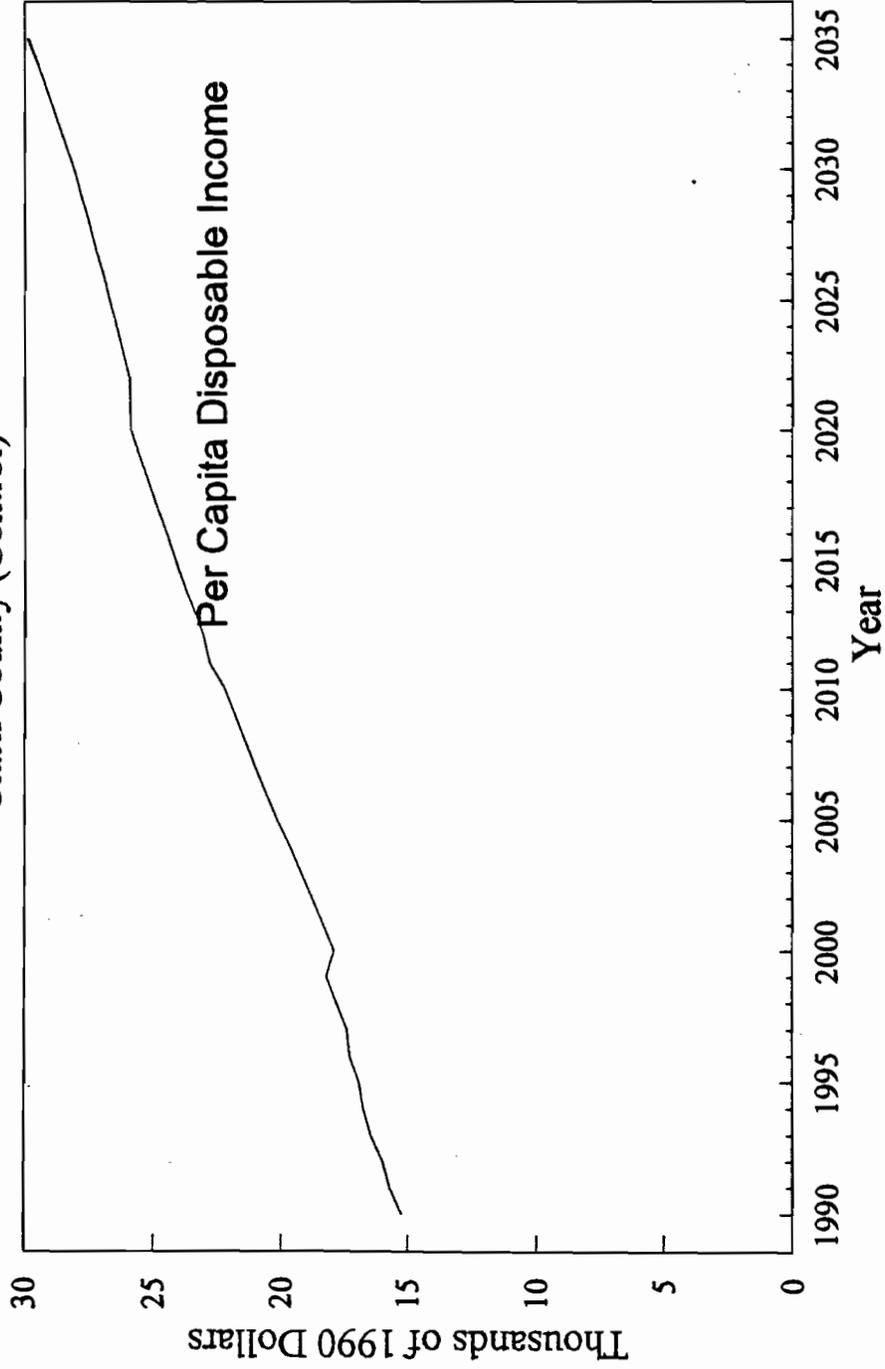


Figure 1.1.3
Clark County (Control)
Per Capita Disposable Income



**Table 1.2
Control Forecast
Nye County**

Year	Thousands of People			Billions of 1990 Dollars		1990 Dollars
	Government Employment	Total Employment	Population	Personal Disposable Income	Gross Regional Product	Per Capita Income
1990	0.858	12.339	16.994	\$0.199	\$0.616	\$11,698
1991	0.887	12.646	17.656	\$0.209	\$0.626	\$11,813
1992	0.919	12.866	18.315	\$0.216	\$0.634	\$11,787
1993	0.956	12.984	19.032	\$0.224	\$0.646	\$11,779
1994	0.996	13.873	19.834	\$0.242	\$0.705	\$12,184
1995	1.031	14.718	20.598	\$0.255	\$0.757	\$12,400
1996	1.063	15.238	21.269	\$0.267	\$0.779	\$12,553
1997	1.102	15.431	21.929	\$0.272	\$0.790	\$12,402
1998	1.142	15.513	22.605	\$0.282	\$0.799	\$12,465
1999	1.183	16.339	23.316	\$0.300	\$0.852	\$12,871
2000	1.231	17.536	24.188	\$0.315	\$0.944	\$13,030
2001	1.279	17.807	25.074	\$0.328	\$0.967	\$13,067
2002	1.322	18.102	25.854	\$0.340	\$0.993	\$13,160
2003	1.365	18.409	26.642	\$0.353	\$1.020	\$13,263
2004	1.409	18.724	27.419	\$0.367	\$1.049	\$13,396
2005	1.452	19.054	28.195	\$0.382	\$1.080	\$13,534
2006	1.496	19.299	28.971	\$0.395	\$1.105	\$13,619
2007	1.540	19.475	29.751	\$0.406	\$1.127	\$13,644
2008	1.584	19.644	30.527	\$0.417	\$1.149	\$13,663
2009	1.629	19.815	31.298	\$0.428	\$1.171	\$13,685
2010	1.673	19.991	32.062	\$0.440	\$1.194	\$13,712
2011	1.718	20.220	32.816	\$0.452	\$1.220	\$13,762
2012	1.761	20.445	33.553	\$0.464	\$1.246	\$13,814
2013	1.805	20.666	34.274	\$0.475	\$1.272	\$13,873
2014	1.848	20.884	34.981	\$0.488	\$1.298	\$13,939
2015	1.889	21.097	35.646	\$0.500	\$1.324	\$14,016
2016	1.930	21.300	36.295	\$0.512	\$1.350	\$14,098
2017	1.971	21.495	36.925	\$0.524	\$1.376	\$14,188
2018	2.011	21.690	37.537	\$0.536	\$1.402	\$14,287
2019	2.051	21.879	38.132	\$0.549	\$1.428	\$14,393
2020	2.091	22.058	38.707	\$0.561	\$1.454	\$14,504
2021	2.130	22.271	39.259	\$0.574	\$1.483	\$14,628
2022	2.169	22.444	39.784	\$0.587	\$1.508	\$14,752
2023	2.207	22.619	40.289	\$0.600	\$1.533	\$14,883
2024	2.245	22.791	40.777	\$0.613	\$1.559	\$15,021
2025	2.283	22.958	41.245	\$0.625	\$1.584	\$15,165
2026	2.321	23.115	41.699	\$0.639	\$1.610	\$15,317
2027	2.359	23.267	42.144	\$0.652	\$1.635	\$15,470
2028	2.397	23.415	42.575	\$0.666	\$1.660	\$15,632
2029	2.435	23.554	42.992	\$0.679	\$1.685	\$15,799
2030	2.473	23.688	43.396	\$0.693	\$1.711	\$15,971
2031	2.511	23.815	43.792	\$0.707	\$1.736	\$16,148
2032	2.550	23.939	44.185	\$0.722	\$1.762	\$16,330
2033	2.589	24.059	44.568	\$0.736	\$1.788	\$16,518
2034	2.629	24.172	44.942	\$0.751	\$1.814	\$16,712
2035	2.668	24.284	45.304	\$0.766	\$1.840	\$16,912

Figure 1.2.1
Total Employment
Nye County (Control)

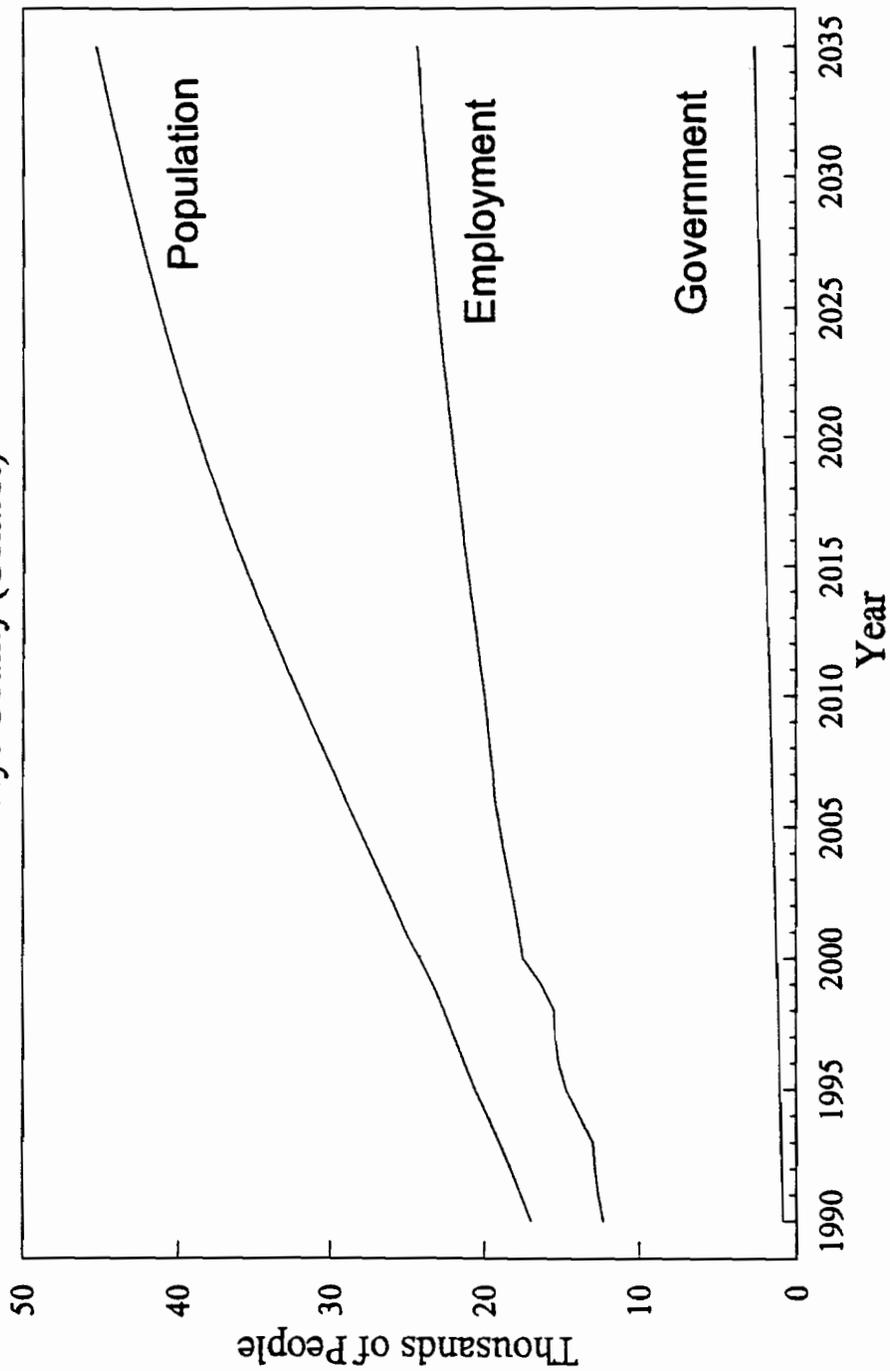


Figure 1.2.2
Income and Gross Regional Product
Nye County (Control)

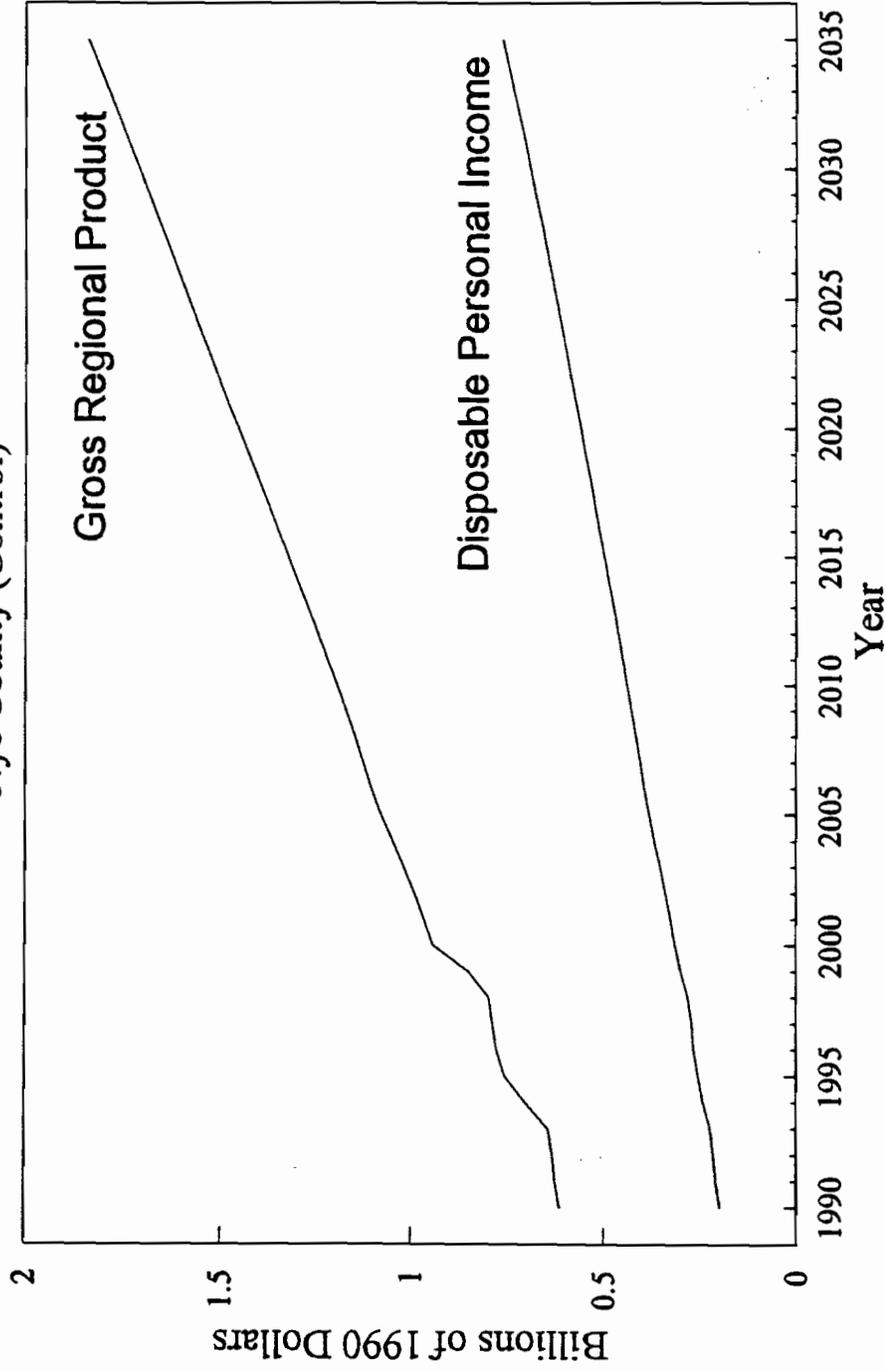


Figure 1.2.3
Per Capita Disposable Income
Nye County (Control)

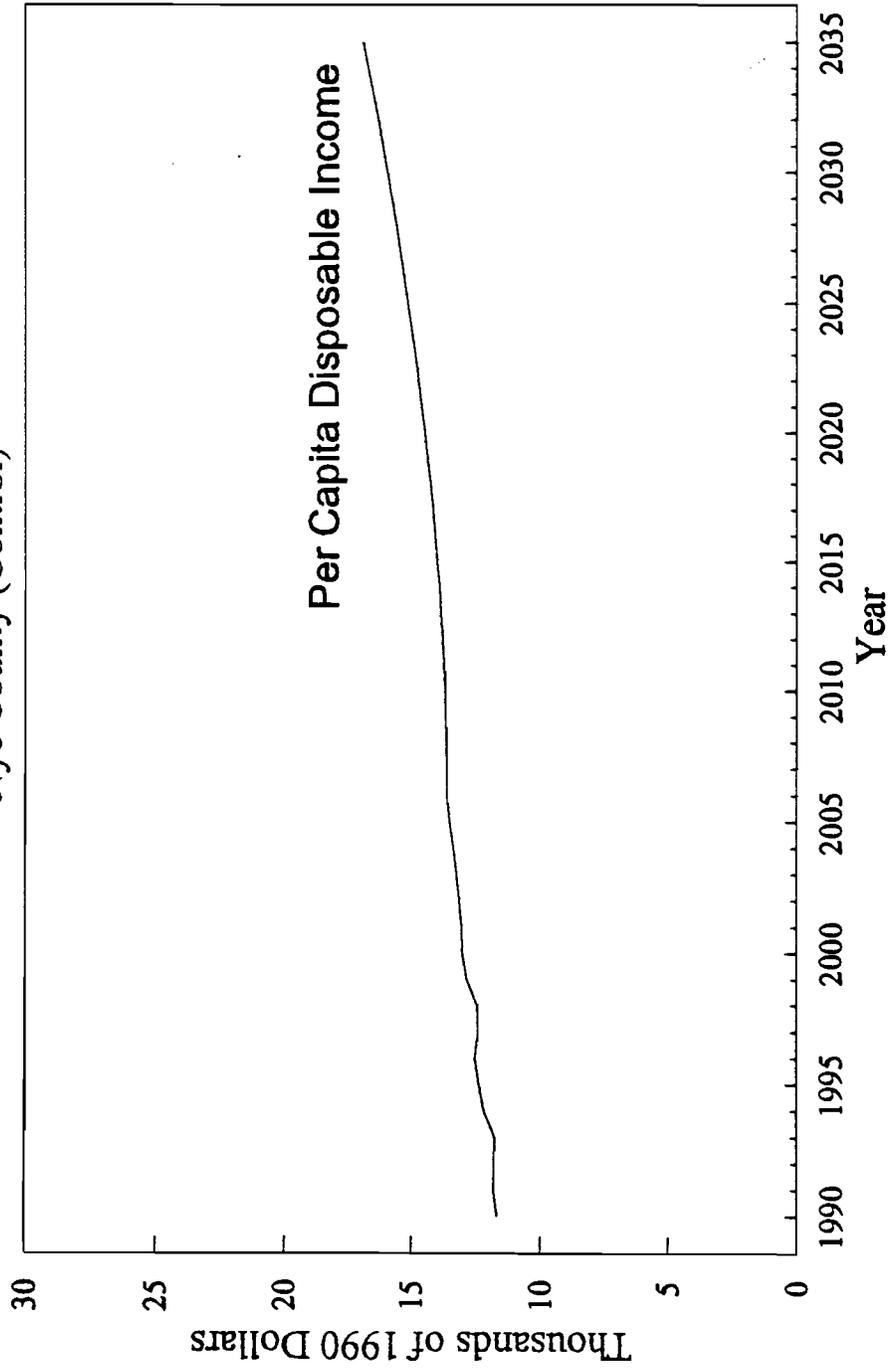


Table 1.3
Control Forecast
Lincoln County

Year	Thousands of People			Billions of 1990 Dollars		1990 Dollars
	Government Employment	Total Employment	Population	Personal Disposable Income	Gross Regional Product	Per Capita Income
1990	0.456	2.303	3.603	\$0.049	\$0.081	\$13,574
1991	0.462	2.336	3.669	\$0.051	\$0.082	\$13,848
1992	0.469	2.349	3.726	\$0.052	\$0.083	\$13,975
1993	0.478	2.353	3.732	\$0.054	\$0.085	\$14,124
1994	0.488	2.488	3.876	\$0.057	\$0.093	\$14,690
1995	0.496	2.632	3.958	\$0.060	\$0.102	\$15,082
1996	0.505	2.729	4.030	\$0.062	\$0.108	\$15,445
1997	0.516	2.756	4.095	\$0.063	\$0.110	\$15,404
1998	0.527	2.764	4.160	\$0.065	\$0.113	\$15,672
1999	0.539	2.900	4.239	\$0.069	\$0.122	\$16,279
2000	0.553	3.065	4.337	\$0.071	\$0.131	\$16,451
2001	0.566	3.093	4.424	\$0.074	\$0.133	\$16,653
2002	0.576	3.122	4.494	\$0.076	\$0.136	\$16,863
2003	0.586	3.154	4.564	\$0.078	\$0.140	\$17,161
2004	0.596	3.186	4.631	\$0.081	\$0.143	\$17,417
2005	0.606	3.221	4.696	\$0.083	\$0.147	\$17,762
2006	0.616	3.245	4.762	\$0.086	\$0.151	\$18,003
2007	0.627	3.258	4.830	\$0.088	\$0.154	\$18,189
2008	0.637	3.270	4.896	\$0.090	\$0.156	\$18,334
2009	0.647	3.282	4.959	\$0.092	\$0.159	\$18,483
2010	0.657	3.294	5.020	\$0.094	\$0.162	\$18,639
2011	0.666	3.315	5.079	\$0.096	\$0.165	\$18,840
2012	0.676	3.334	5.135	\$0.098	\$0.168	\$19,005
2013	0.685	3.353	5.188	\$0.100	\$0.171	\$19,220
2014	0.694	3.371	5.238	\$0.102	\$0.174	\$19,397
2015	0.702	3.389	5.284	\$0.104	\$0.177	\$19,592
2016	0.710	3.405	5.329	\$0.105	\$0.180	\$19,784
2017	0.719	3.421	5.373	\$0.108	\$0.184	\$20,016
2018	0.727	3.437	5.414	\$0.109	\$0.186	\$20,214
2019	0.736	3.451	5.455	\$0.112	\$0.190	\$20,453
2020	0.744	3.465	5.493	\$0.113	\$0.192	\$20,657
2021	0.752	3.482	5.529	\$0.116	\$0.196	\$20,905
2022	0.760	3.495	5.562	\$0.118	\$0.199	\$21,160
2023	0.768	3.508	5.594	\$0.120	\$0.201	\$21,382
2024	0.776	3.521	5.625	\$0.122	\$0.204	\$21,641
2025	0.785	3.534	5.654	\$0.124	\$0.207	\$21,901
2026	0.793	3.546	5.685	\$0.126	\$0.210	\$22,194
2027	0.802	3.557	5.716	\$0.128	\$0.213	\$22,444
2028	0.811	3.568	5.746	\$0.131	\$0.216	\$22,731
2029	0.820	3.578	5.776	\$0.133	\$0.219	\$23,018
2030	0.829	3.588	5.805	\$0.135	\$0.222	\$23,301
2031	0.839	3.597	5.836	\$0.138	\$0.225	\$23,616
2032	0.849	3.607	5.867	\$0.140	\$0.227	\$23,887
2033	0.859	3.616	5.898	\$0.143	\$0.230	\$24,226
2034	0.869	3.624	5.930	\$0.145	\$0.233	\$24,524
2035	0.880	3.633	5.962	\$0.148	\$0.236	\$24,854

Figure 1.3.1
Total Employment
 Lincoln County (Control)

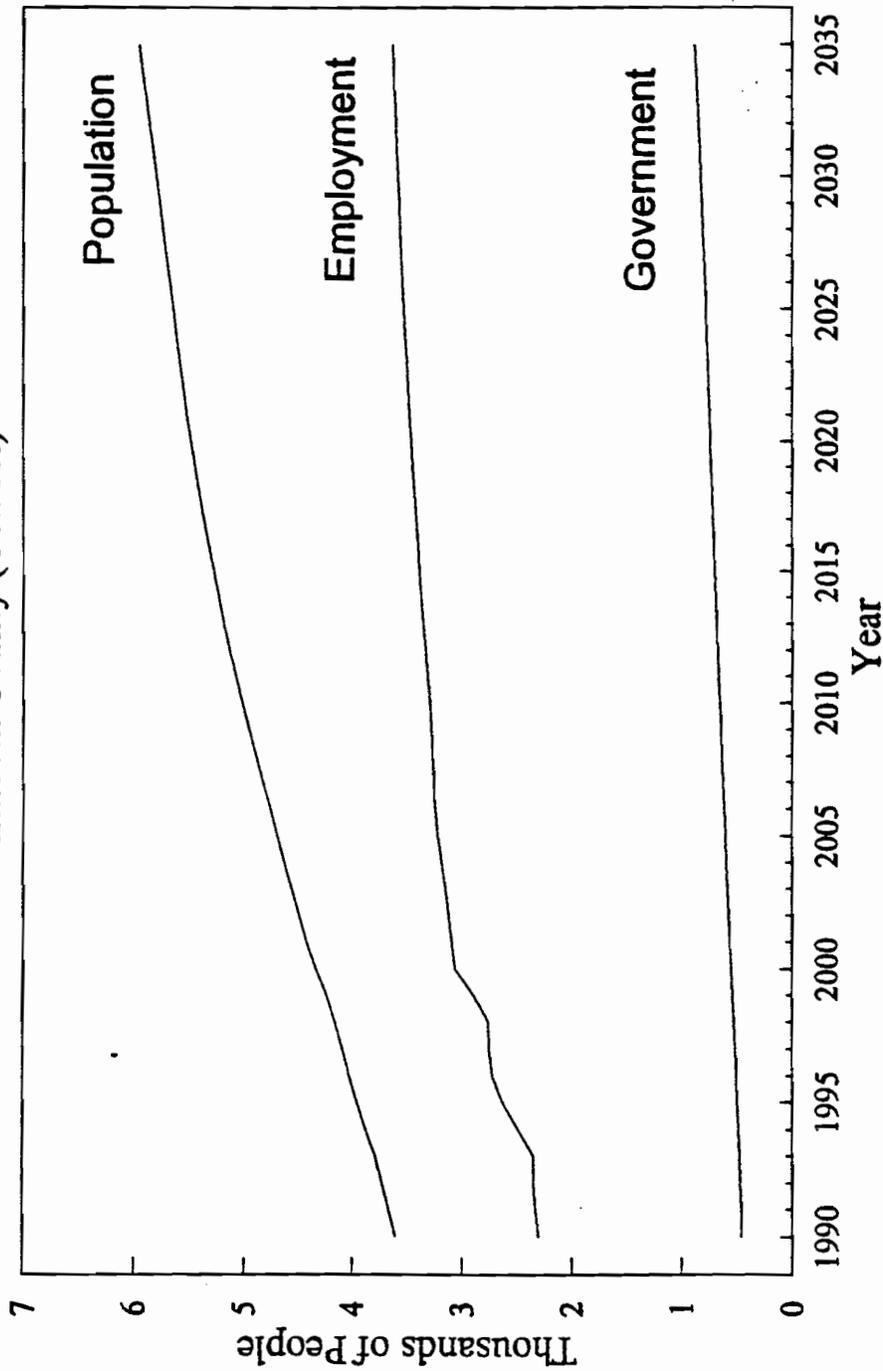


Figure 1.3.2
Income and Gross Regional Product
Lincoln County (Control)

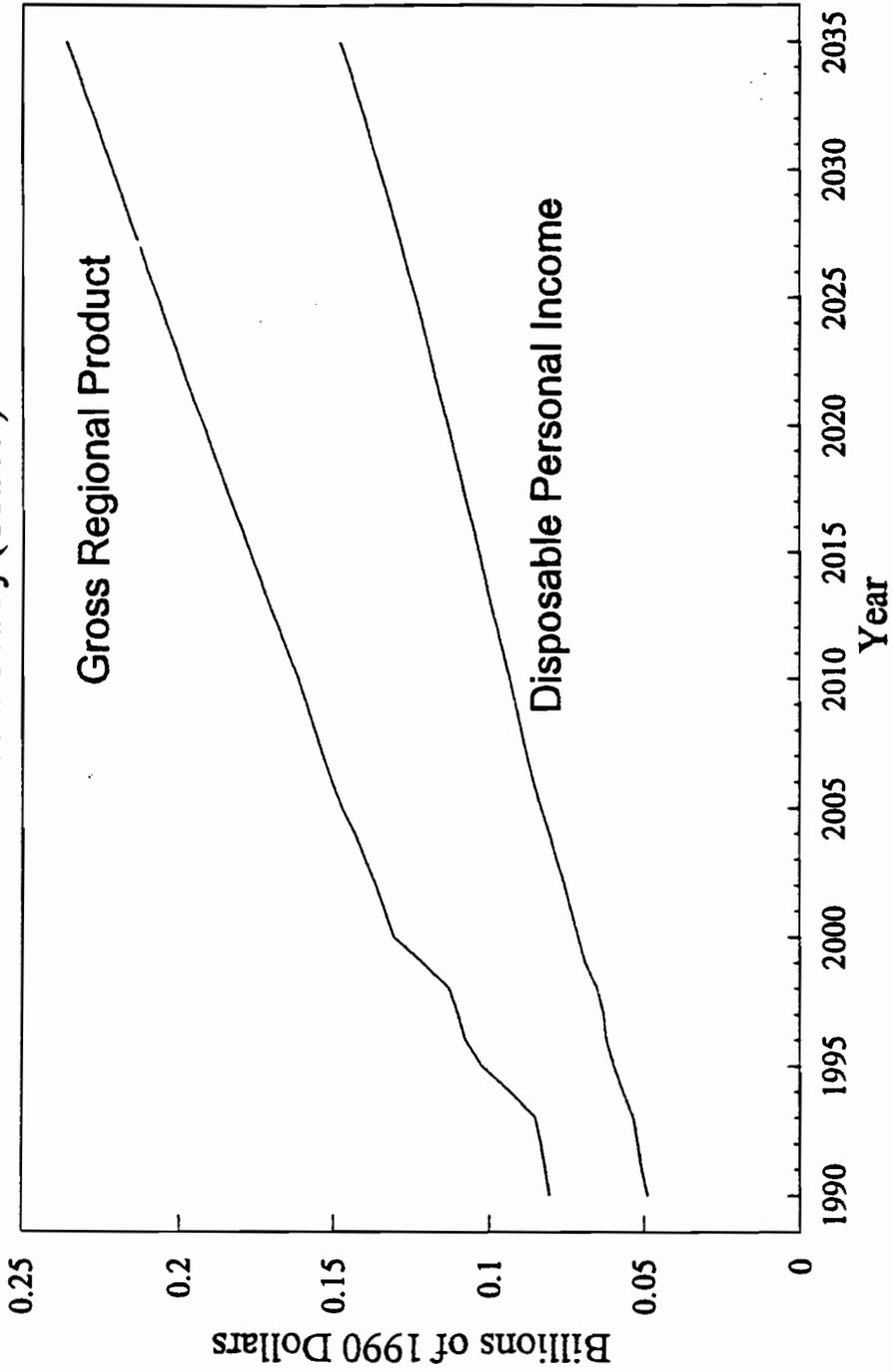
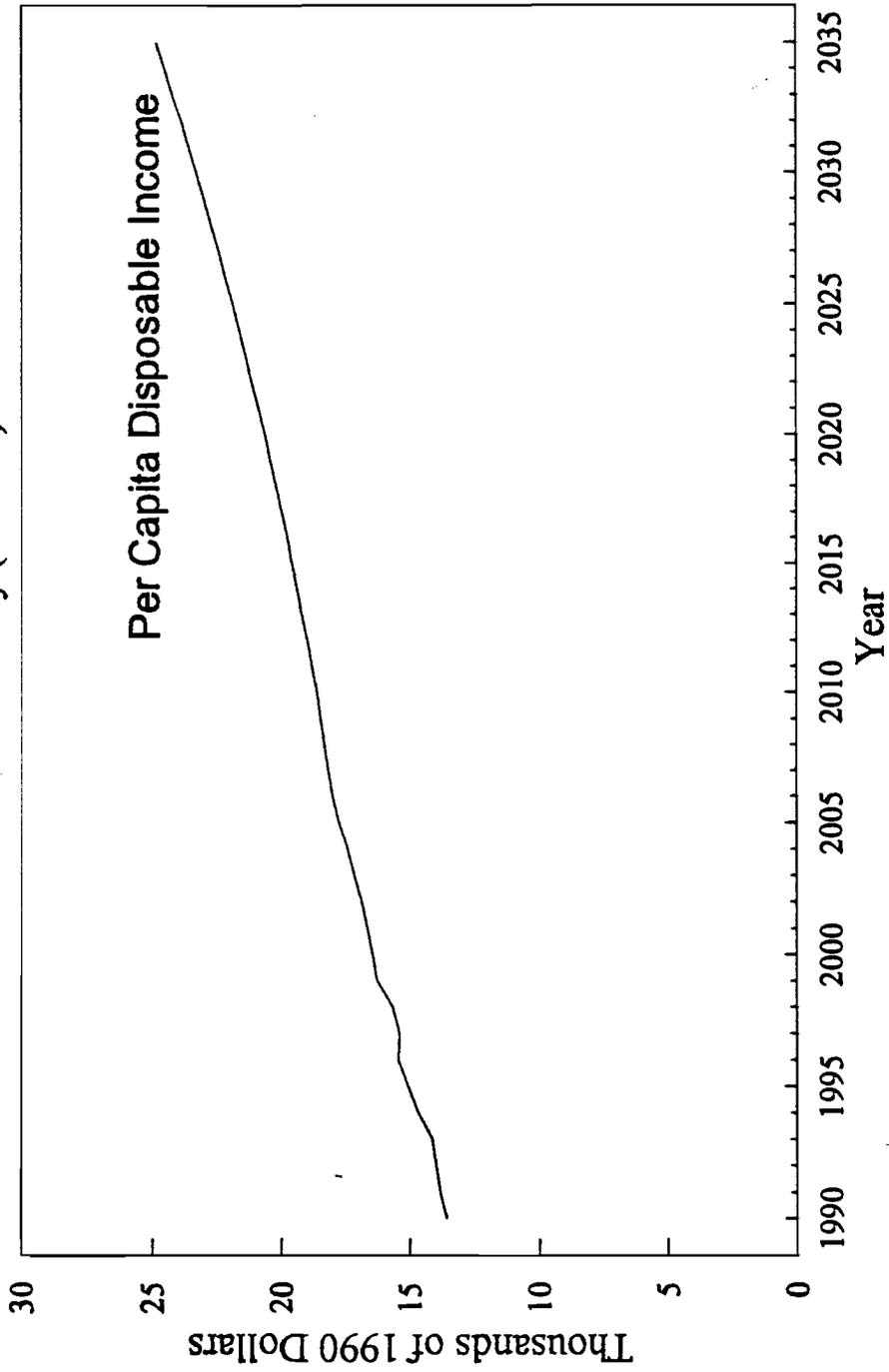


Figure 1.3.3
Per Capita Disposable Income
Lincoln County (Control)



**Table 1.4
Control Forecast
Rural Nevada**

Year	Thousands of People			Billions of 1990 Dollars		1990 Dollars
	Government Employment	Total Employment	Population	Personal Disposable Income	Gross Regional Product	Per Capita Income
1990	9.641	103.637	157.733	\$2.253	\$4.394	\$14,281
1991	9.848	103.313	161.684	\$2.341	\$4.391	\$14,482
1992	10.072	104.485	164.856	\$2.427	\$4.452	\$14,723
1993	10.355	104.848	169.656	\$2.525	\$4.509	\$14,882
1994	10.628	107.145	174.127	\$2.647	\$4.716	\$15,199
1995	10.791	110.185	177.408	\$2.718	\$4.900	\$15,323
1996	10.952	112.795	180.267	\$2.790	\$5.022	\$15,477
1997	11.216	114.605	183.631	\$2.833	\$5.150	\$15,427
1998	11.506	115.568	187.266	\$2.930	\$5.244	\$15,646
1999	11.747	117.993	191.449	\$3.045	\$5.419	\$15,904
2000	11.969	122.629	195.235	\$3.111	\$5.845	\$15,935
2001	12.235	125.198	200.177	\$3.232	\$6.038	\$16,147
2002	12.462	128.198	205.238	\$3.365	\$6.310	\$16,393
2003	12.727	130.524	210.359	\$3.464	\$6.469	\$16,468
2004	12.971	132.207	213.911	\$3.598	\$6.601	\$16,819
2005	13.287	134.544	217.762	\$3.714	\$6.826	\$17,056
2006	13.507	136.633	221.776	\$3.833	\$7.038	\$17,283
2007	13.811	137.634	224.960	\$3.950	\$7.184	\$17,560
2008	14.065	138.703	228.935	\$4.057	\$7.342	\$17,720
2009	14.354	140.205	233.010	\$4.169	\$7.427	\$17,890
2010	14.627	141.074	236.958	\$4.274	\$7.537	\$18,035
2011	14.897	142.448	240.850	\$4.381	\$7.706	\$18,189
2012	15.167	143.899	244.756	\$4.498	\$7.863	\$18,376
2013	15.437	145.242	248.576	\$4.612	\$8.016	\$18,556
2014	15.712	146.471	252.397	\$4.729	\$8.173	\$18,738
2015	15.977	148.428	256.052	\$4.854	\$8.377	\$18,957
2016	16.237	150.300	259.603	\$4.976	\$8.572	\$19,166
2017	16.493	151.833	262.974	\$5.097	\$8.738	\$19,381
2018	16.755	153.027	266.244	\$5.212	\$8.893	\$19,575
2019	17.017	154.091	269.457	\$5.334	\$9.049	\$19,794
2020	17.280	155.871	272.619	\$5.465	\$9.246	\$20,046
2021	17.548	158.286	275.853	\$5.595	\$9.498	\$20,284
2022	17.815	159.659	278.991	\$5.723	\$9.672	\$20,513
2023	18.076	161.041	281.926	\$5.851	\$9.847	\$20,752
2024	18.339	162.407	284.803	\$5.981	\$10.025	\$20,999
2025	18.600	163.754	287.580	\$6.112	\$10.202	\$21,254
2026	18.866	165.083	290.320	\$6.247	\$10.381	\$21,516
2027	19.135	166.296	293.053	\$6.381	\$10.553	\$21,774
2028	19.408	167.429	295.735	\$6.516	\$10.723	\$22,035
2029	19.682	168.512	298.365	\$6.654	\$10.892	\$22,300
2030	19.959	169.576	300.947	\$6.793	\$11.062	\$22,570
2031	20.242	170.620	303.540	\$6.935	\$11.233	\$22,848
2032	20.531	171.703	306.147	\$7.081	\$11.407	\$23,130
2033	20.823	172.762	308.716	\$7.231	\$11.583	\$23,422
2034	21.119	173.786	311.241	\$7.382	\$11.759	\$23,720
2035	21.416	174.793	313.711	\$7.537	\$11.937	\$24,026

Figure 1.4.1
Total Employment
 Rural Nevada (Control)

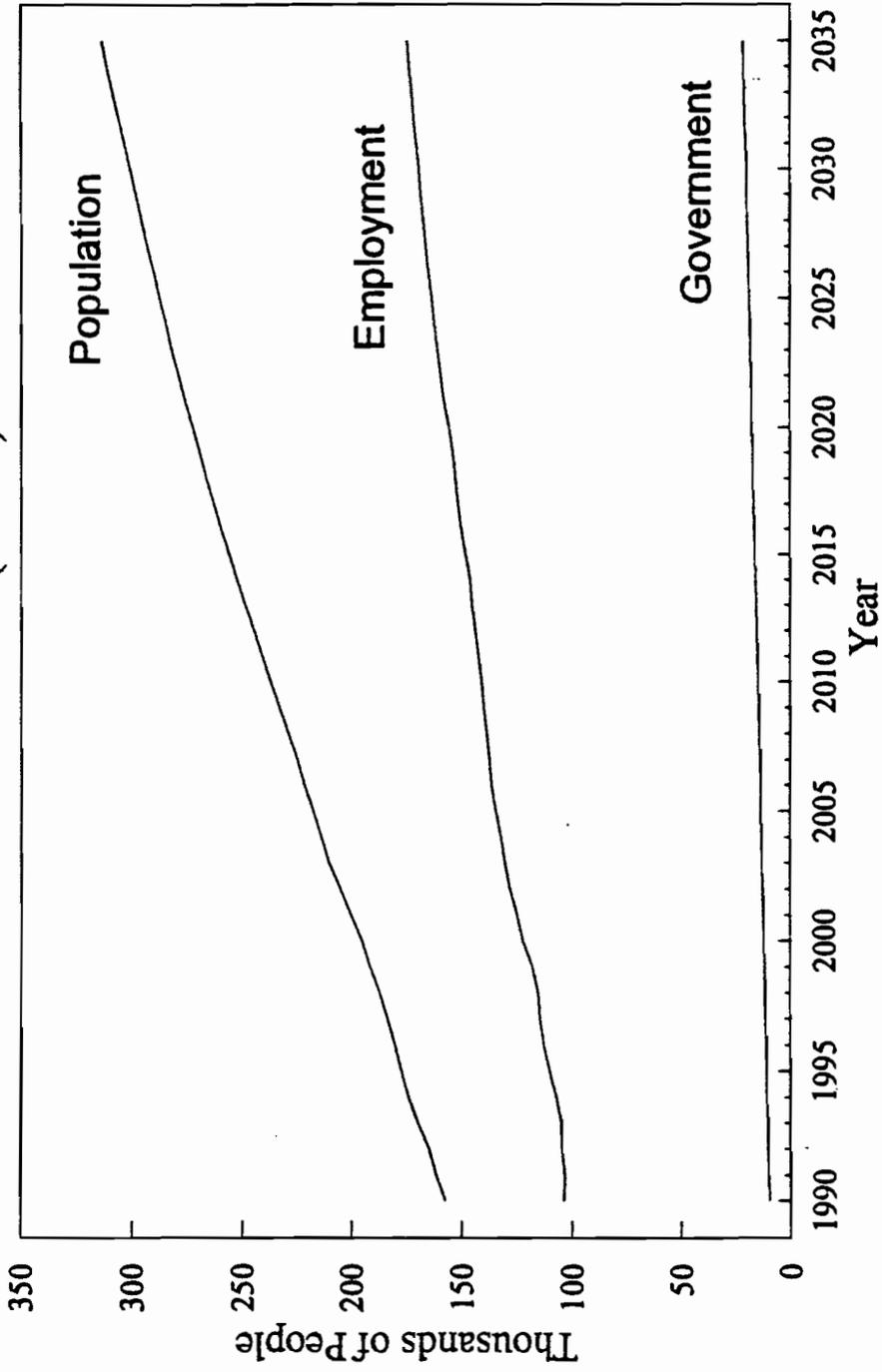


Figure 1.4.2
Income and Gross Regional Product
 Rural Nevada (Control)

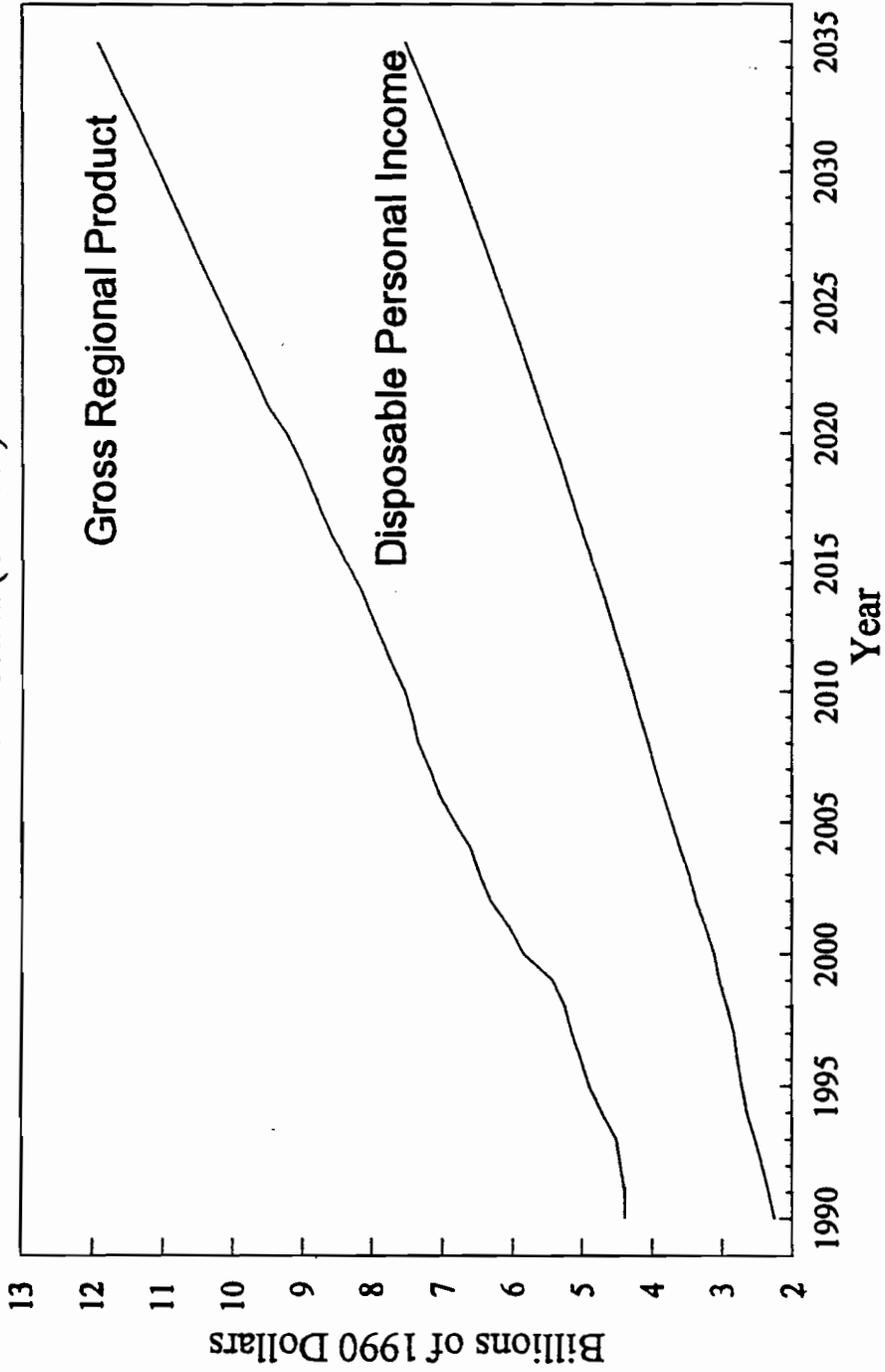


Figure 1.4.3
Per Capita Disposable Income
Rural Nevada (Control)

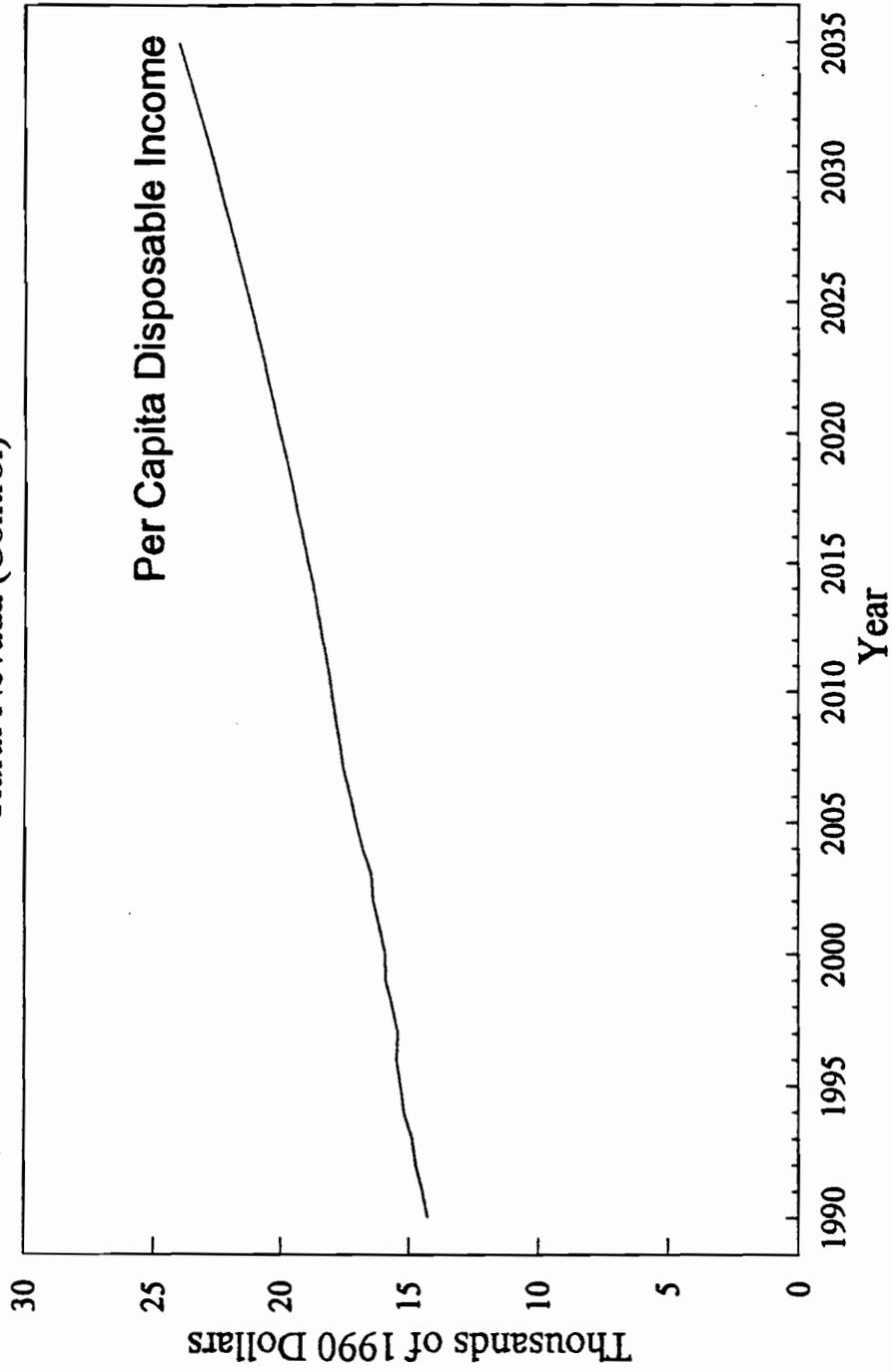


Table 1.5
Control Forecast
Washoe County and Carson City

Year	Thousands of People			Billions of 1990 Dollars		1990 Dollars
	Government Employment	Total Employment	Population	Personal Disposable Income	Gross Regional Product	Per Capita Income
1990	21.168	207.890	305.028	\$5.399	\$9.313	\$17,699
1991	21.894	213.359	316.861	\$5.695	\$9.687	\$17,972
1992	22.660	218.358	328.347	\$5.966	\$9.951	\$18,171
1993	23.585	221.743	341.437	\$6.274	\$10.243	\$18,374
1994	24.384	226.501	353.252	\$6.573	\$10.632	\$18,606
1995	25.011	236.614	363.547	\$6.840	\$11.370	\$18,815
1996	25.754	246.490	374.831	\$7.141	\$12.007	\$19,050
1997	26.735	253.520	386.778	\$7.355	\$12.492	\$19,017
1998	27.701	257.475	398.960	\$7.715	\$12.909	\$19,338
1999	28.522	262.292	408.825	\$8.053	\$13.441	\$19,697
2000	29.203	269.705	417.366	\$8.155	\$14.044	\$19,540
2001	29.957	273.887	427.187	\$8.454	\$14.420	\$19,790
2002	30.744	278.542	437.395	\$8.777	\$14.844	\$20,067
2003	31.537	283.497	447.598	\$9.119	\$15.303	\$20,373
2004	32.333	288.670	457.759	\$9.484	\$15.794	\$20,719
2005	33.139	294.121	468.004	\$9.863	\$16.314	\$21,074
2006	33.974	299.030	478.588	\$10.235	\$16.812	\$21,386
2007	34.840	302.657	489.509	\$10.587	\$17.243	\$21,627
2008	35.718	306.132	500.510	\$10.939	\$17.671	\$21,856
2009	36.613	309.653	511.668	\$11.298	\$18.108	\$22,082
2010	37.523	313.229	522.928	\$11.665	\$18.553	\$22,307
2011	38.443	317.594	534.224	\$12.044	\$19.046	\$22,544
2012	39.366	321.865	545.440	\$12.425	\$19.534	\$22,779
2013	40.291	326.082	556.568	\$12.810	\$20.020	\$23,017
2014	41.228	330.280	567.693	\$13.203	\$20.510	\$23,257
2015	42.138	334.317	578.302	\$13.594	\$20.994	\$23,507
2016	43.054	338.286	588.821	\$13.991	\$21.477	\$23,761
2017	43.970	342.171	599.154	\$14.392	\$21.959	\$24,021
2018	44.885	345.999	609.281	\$14.799	\$22.442	\$24,290
2019	45.805	349.789	619.263	\$15.213	\$22.927	\$24,566
2020	46.726	353.508	629.050	\$15.632	\$23.412	\$24,851
2021	47.652	357.999	638.666	\$16.062	\$23.947	\$25,149
2022	48.575	362.203	648.016	\$16.491	\$24.457	\$25,448
2023	49.494	366.319	657.074	\$16.922	\$24.962	\$25,754
2024	50.416	370.342	665.937	\$17.358	\$25.462	\$26,066
2025	51.337	374.284	674.540	\$17.799	\$25.958	\$26,386
2026	52.272	378.164	683.040	\$18.247	\$26.452	\$26,715
2027	53.218	381.965	691.522	\$18.703	\$26.943	\$27,046
2028	54.177	385.770	699.897	\$19.170	\$27.439	\$27,389
2029	55.145	389.462	708.142	\$19.643	\$27.930	\$27,739
2030	56.120	393.101	716.251	\$20.124	\$28.420	\$28,097
2031	57.119	396.702	724.424	\$20.619	\$28.913	\$28,463
2032	58.145	400.294	732.706	\$21.127	\$29.410	\$28,835
2033	59.187	403.846	740.967	\$21.648	\$29.908	\$29,216
2034	60.245	407.312	749.177	\$22.179	\$30.405	\$29,605
2035	61.312	410.713	757.276	\$22.720	\$30.901	\$30,002

Figure 1.5.1
Total Employment
 Washoe County and Carson City (Control)

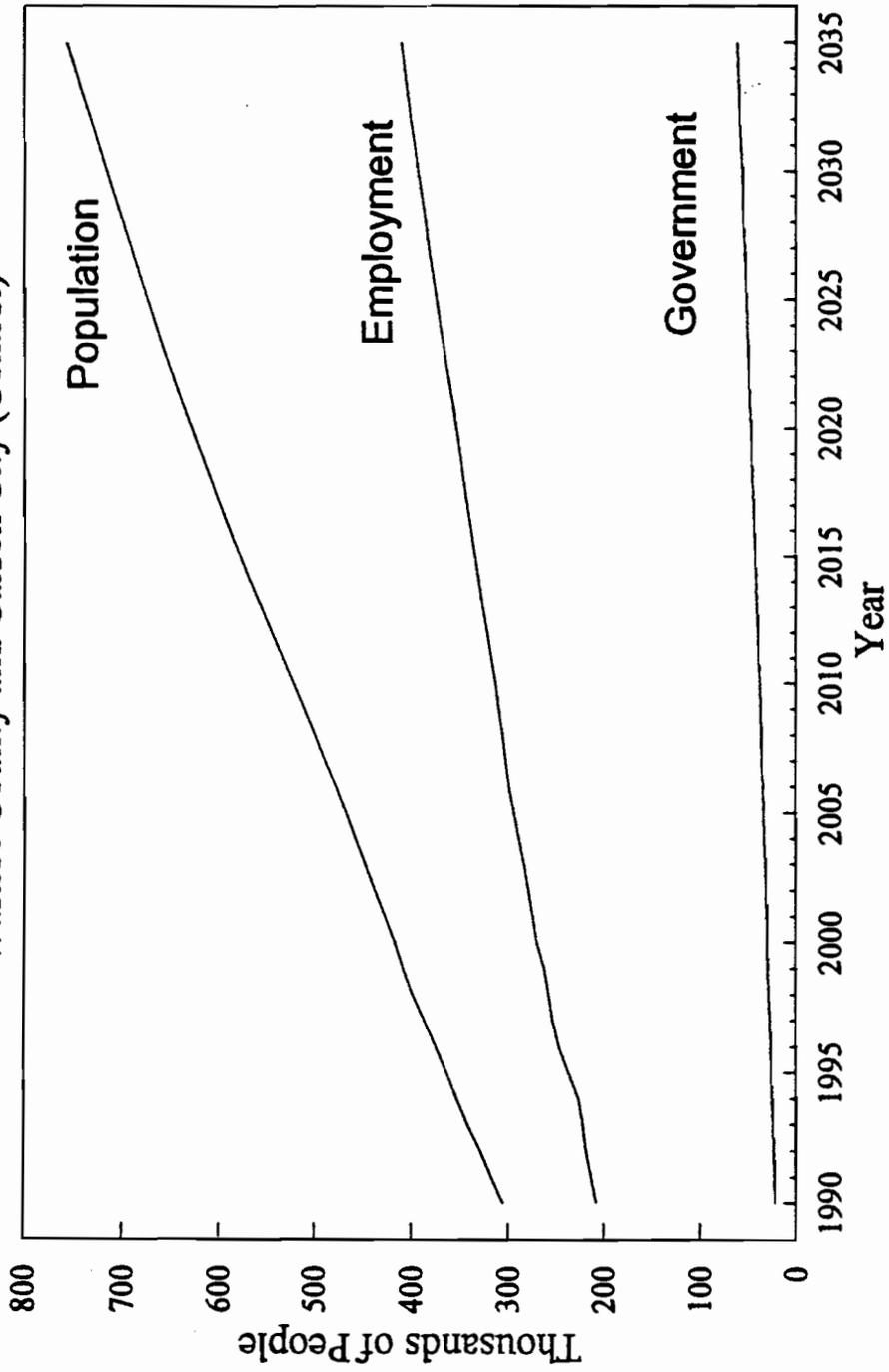


Figure 1.5.2
Income and Gross Regional Product
Washoe County and Carson City (Control)

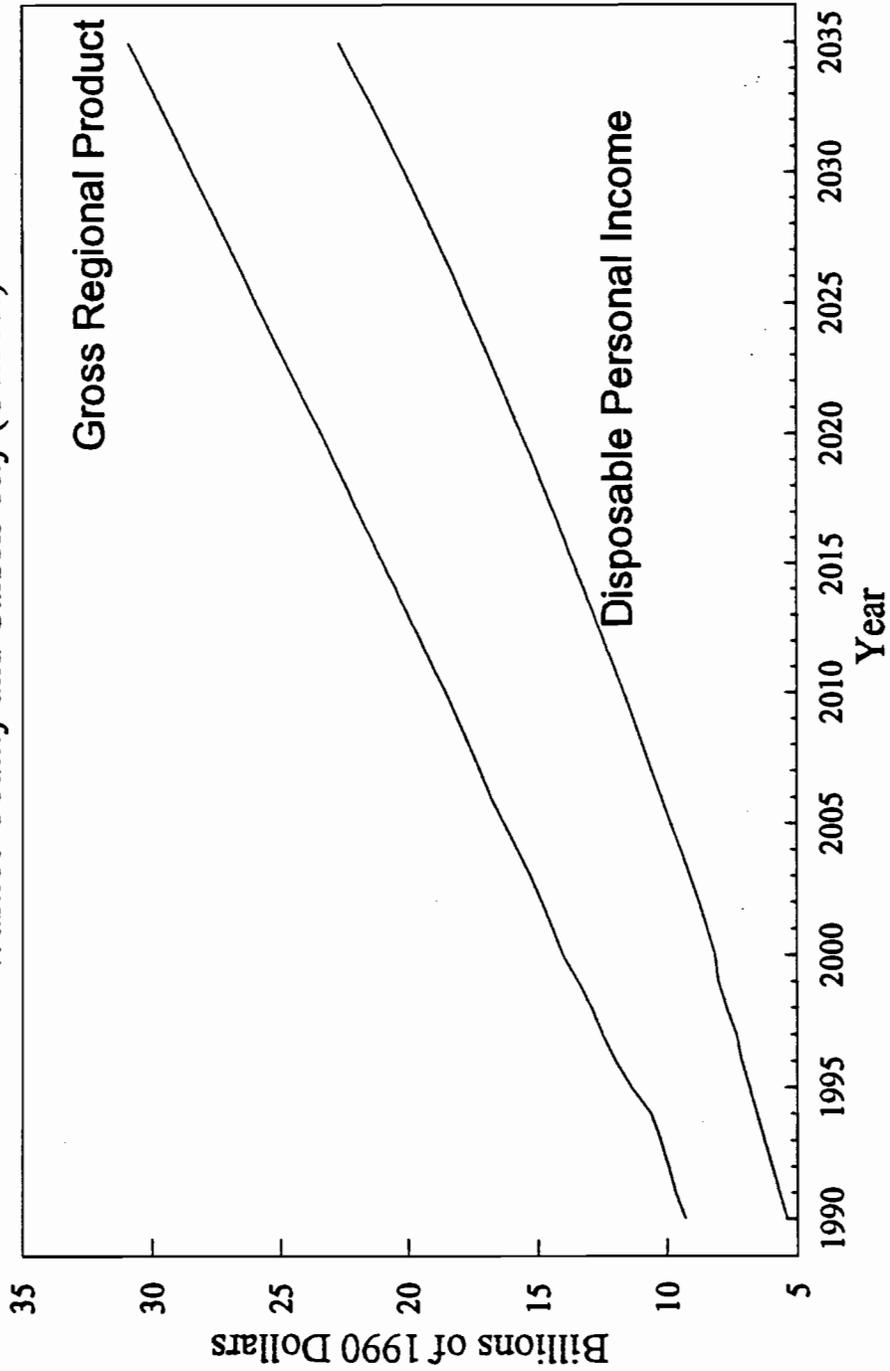


Figure 1.5.3
Per Capita Disposable Income
Washoe County and Carson City (Control)

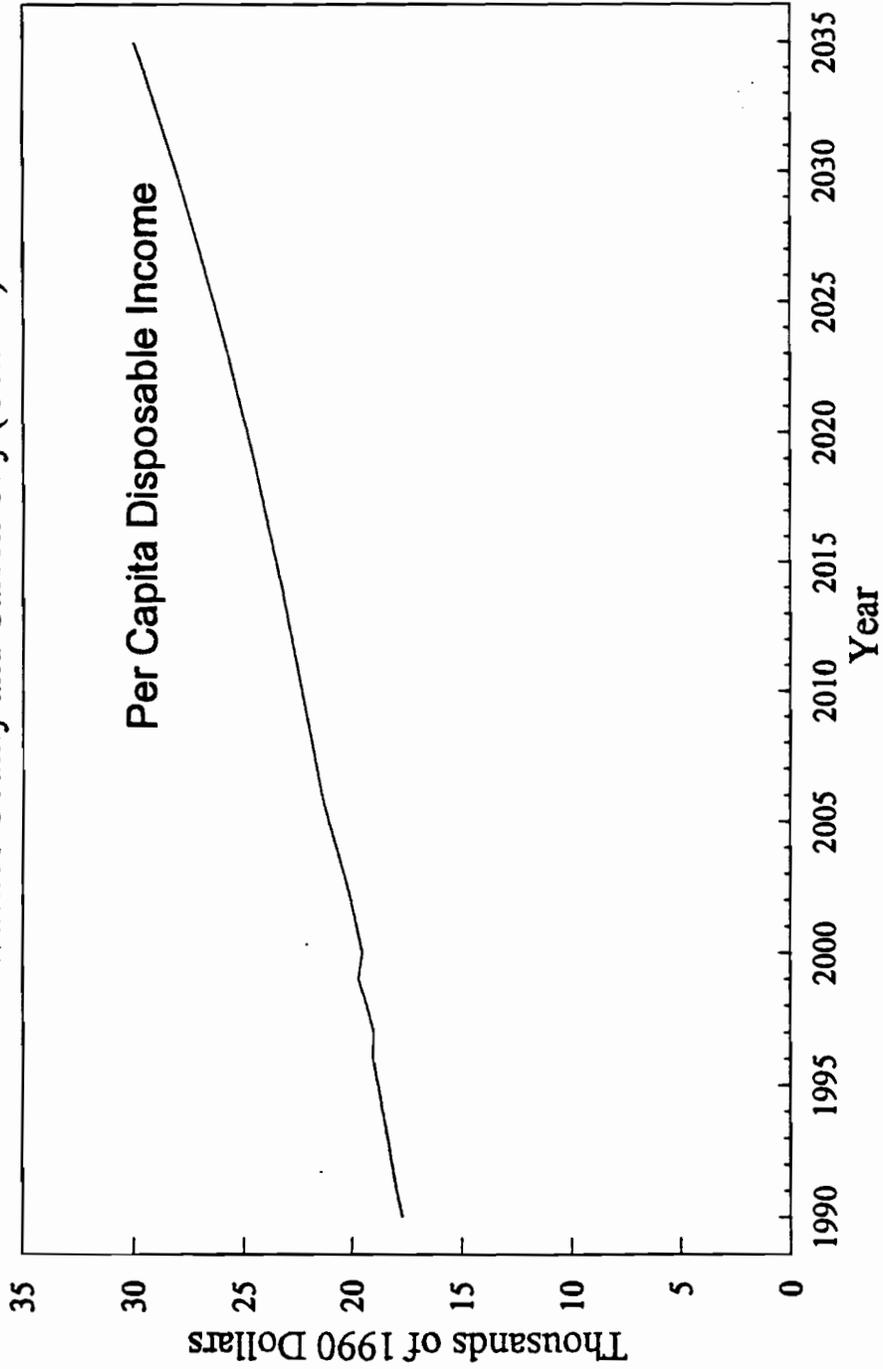


Table 1.6
Control Forecast
State of Nevada

Year	Thousands of People			Billions of 1990 Dollars		1990 Dollars
	Government Employment	Total Employment	Population	Personal Disposable Income	Gross Regional Product	Per Capita Income
1990	83.081	763.185	1,283.227	\$20.172	\$33.860	\$15,720
1991	85.790	786.290	1,332.144	\$21.433	\$35.152	\$16,089
1992	88.564	807.301	1,379.935	\$22.559	\$36.121	\$16,348
1993	92.077	828.341	1,430.959	\$23.916	\$37.455	\$16,713
1994	95.184	850.549	1,480.378	\$25.176	\$39.053	\$17,007
1995	97.495	890.456	1,527.089	\$26.248	\$41.740	\$17,188
1996	100.128	933.786	1,574.364	\$27.547	\$44.199	\$17,497
1997	103.742	963.685	1,622.809	\$28.480	\$46.017	\$17,550
1998	107.410	984.866	1,671.759	\$29.964	\$47.607	\$17,924
1999	110.778	1,016.379	1,718.941	\$31.473	\$50.016	\$18,310
2000	113.443	1,046.289	1,764.401	\$31.901	\$52.289	\$18,081
2001	116.410	1,072.467	1,803.344	\$33.236	\$54.023	\$18,430
2002	119.559	1,100.206	1,842.793	\$34.677	\$55.963	\$18,817
2003	122.662	1,126.462	1,882.297	\$36.112	\$57.821	\$19,185
2004	125.695	1,153.034	1,920.190	\$37.660	\$59.762	\$19,613
2005	128.846	1,181.395	1,958.467	\$39.242	\$61.900	\$20,037
2006	132.076	1,208.806	1,997.244	\$40.827	\$64.040	\$20,442
2007	135.584	1,231.304	2,035.530	\$42.351	\$65.926	\$20,806
2008	139.094	1,251.561	2,074.685	\$43.849	\$67.736	\$21,135
2009	142.697	1,272.440	2,114.098	\$45.375	\$69.512	\$21,463
2010	146.356	1,292.747	2,153.487	\$46.925	\$71.341	\$21,790
2011	149.609	1,315.195	2,189.514	\$48.731	\$73.301	\$22,257
2012	152.850	1,335.925	2,225.475	\$49.996	\$75.173	\$22,465
2013	156.092	1,356.455	2,261.263	\$51.543	\$77.046	\$22,794
2014	159.380	1,376.839	2,297.050	\$53.117	\$78.934	\$23,124
2015	162.533	1,395.792	2,332.154	\$54.668	\$80.773	\$23,441
2016	165.634	1,412.611	2,367.063	\$56.184	\$82.391	\$23,736
2017	168.746	1,431.128	2,401.608	\$57.762	\$84.216	\$24,051
2018	171.904	1,449.140	2,435.844	\$59.362	\$86.031	\$24,370
2019	175.047	1,465.330	2,469.881	\$60.971	\$87.784	\$24,686
2020	178.149	1,480.525	2,503.669	\$62.584	\$89.511	\$24,997
2021	179.777	1,487.621	2,537.099	\$63.705	\$90.647	\$25,109
2022	181.264	1,498.081	2,570.168	\$64.846	\$92.004	\$25,230
2023	184.031	1,511.743	2,602.001	\$66.348	\$93.617	\$25,499
2024	186.866	1,526.838	2,635.061	\$67.896	\$95.295	\$25,766
2025	189.680	1,540.139	2,667.023	\$69.444	\$96.887	\$26,038
2026	192.542	1,554.879	2,698.843	\$71.038	\$98.555	\$26,322
2027	195.460	1,569.186	2,730.639	\$72.662	\$100.204	\$26,610
2028	198.392	1,581.755	2,762.276	\$74.301	\$101.786	\$26,898
2029	201.356	1,595.433	2,793.731	\$75.980	\$103.425	\$27,196
2030	204.341	1,607.209	2,825.003	\$77.670	\$104.982	\$27,494
2031	207.398	1,620.270	2,852.827	\$79.417	\$106.615	\$27,838
2032	210.562	1,633.110	2,881.278	\$81.217	\$108.250	\$28,188
2033	213.775	1,644.151	2,909.572	\$83.044	\$109.819	\$28,542
2034	217.122	1,656.485	2,938.837	\$84.949	\$111.468	\$28,905
2035	220.607	1,668.527	2,969.165	\$86.920	\$113.123	\$29,274

Figure 1.6.1
Employment and Population
State of Nevada (Control)

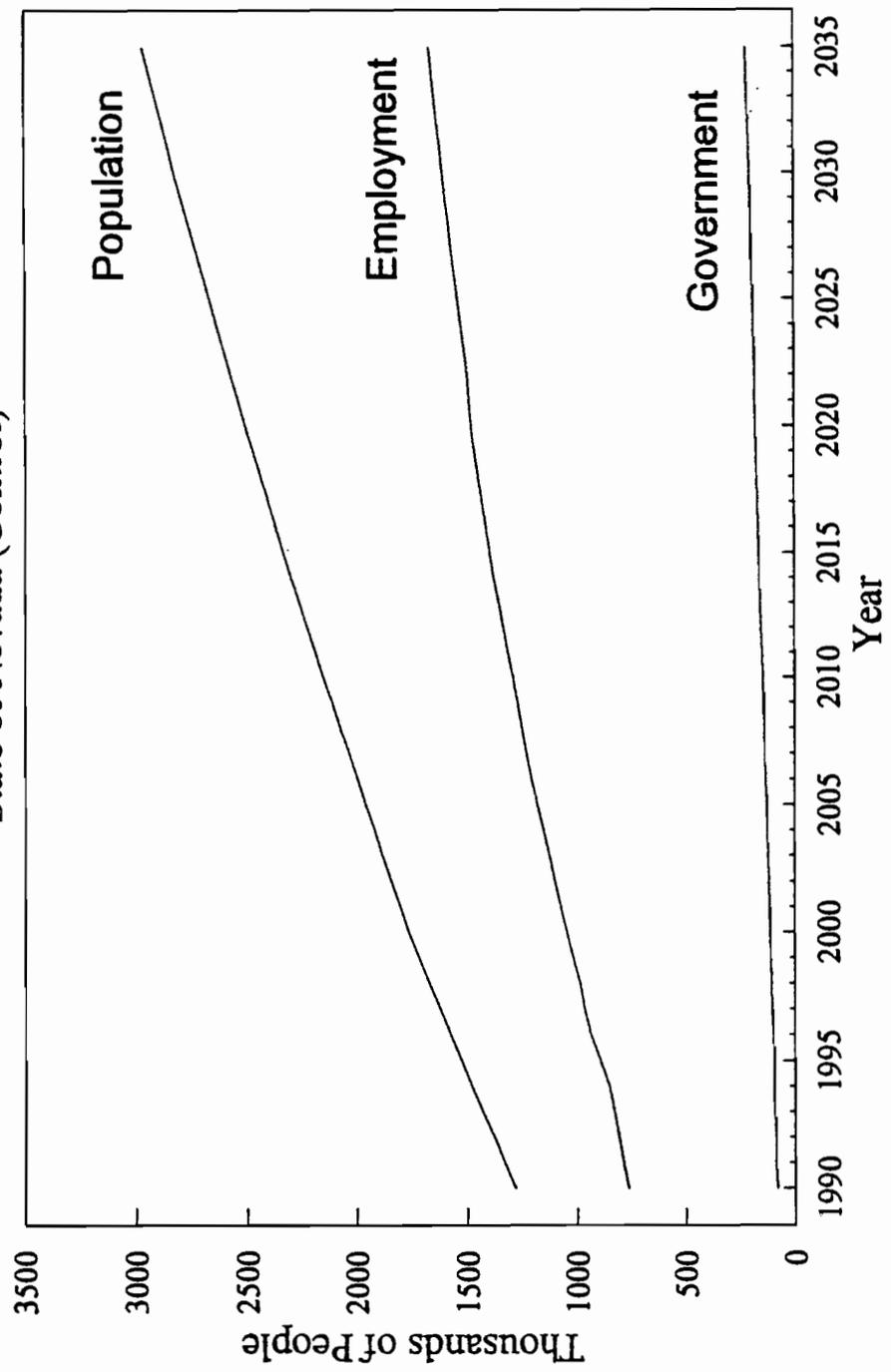


Figure 1.6.2
Income and Gross Regional Product
 State of Nevada (Control)

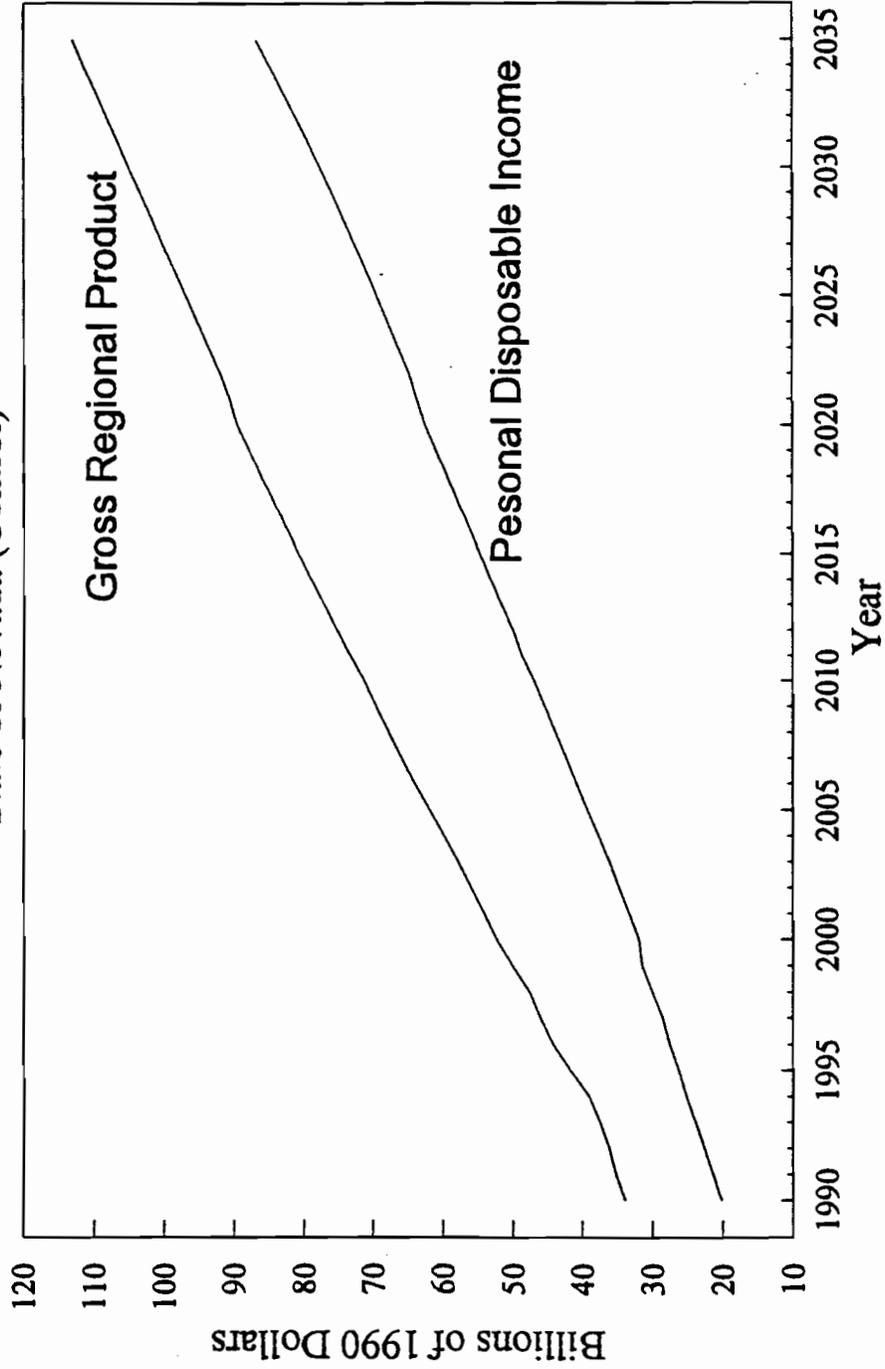
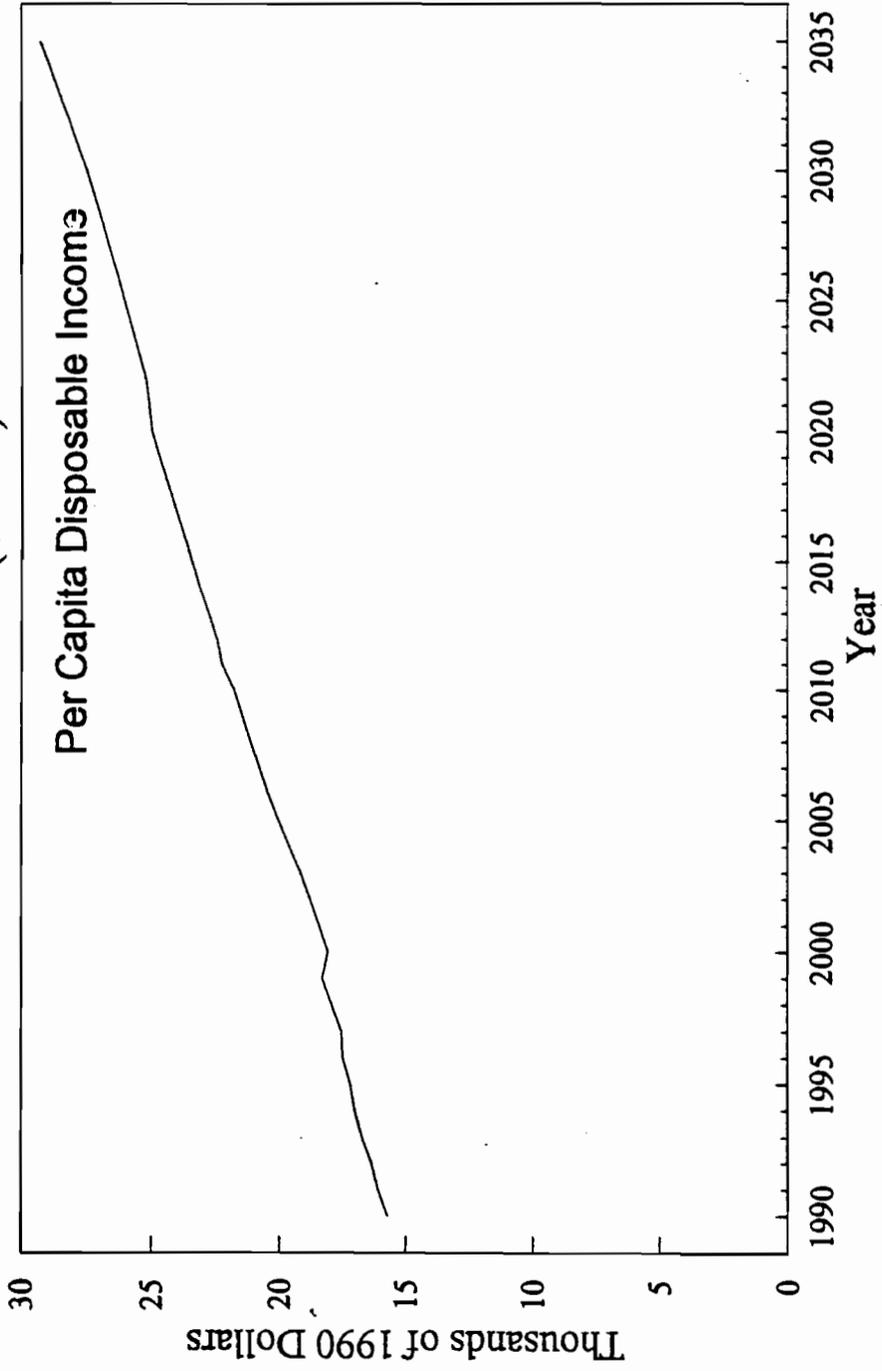


Figure 1.6.3
Per Capita Disposable Income
State of Nevada (Control)



Part II

Cross-Sectional Analysis of the Impact of Growth Rates on Social and Economic Well-Being

Introduction

This part of our study, which is independent of the REMI-based analysis in Part I, seeks to confirm, or where appropriate, refute the general conclusions from that analysis. It does so by examining the general relationships among economic variables that are evident in the records of many other American cities with varying rates of growth over different periods of time.

Phase I

Initially, for this analysis, we examined the behavior of 79 variables in 312 metropolitan areas in the period 1980 through 1984. According to their rates of growth of population, we identified cities as having negative growth (N)—61 cities; low growth (L), zero to six percent—149 cities; moderate growth (M), seven to twelve percent—62 cities; and high growth (H), over twelve percent—39 cities.¹ Table 2.1 displays the basic data for the four groups. Figure 2.1.1 indicates the relative sizes of each group of cities. Figure 2.1.2 shows the weighted average growth² for each city-growth category.

As a whole, the areas falling into the negative-growth category averaged a decline of 1.94 percent over the four-year period, or nearly one-half of one percent per year. Cities in the low-growth group averaged an increase of 2.8

¹ The number sums to 311 because one city's population was missing for 1970.

² Each city's growth rate was weighted by its relative population size.

percent over the period, or about 0.7 percent per year. The moderate-growth city group had a weighted average growth of 9.4 percent, or about 2.3 percent per year. The high-rate-of-growth cities grew 21.6 percent or 5 percent per year.

As shown in Figure 2.1.3, per capita income in 1983 tended to be greatest in those areas with the most rapid growth. Cities in the negative-growth sector had per capita income of \$10,803. The low-growth group per capita income at \$11,396 was higher, but not significantly so, than the moderate-growth income of \$11,359. High-growth group per capita income, at \$11,440, was significantly higher than that of any other group. The slower the area's growth rate, the lower its per capita income.

The change in per capita income between 1980 and 1984 was significantly smaller in negative-growth cities than in other cities (See Figure 2.1.4). Cities in the negative-growth group had an increase in per capita income of only \$1,637. Per capita incomes grow an average of \$2,240, \$2075, and \$2177 for low-, moderate-, and high-growth cities, respectively.

Inflation-adjusted (real) per capita income in negative-growth communities (see Figure 2.1.5) shows a decline of 2.4 percent over the 1980-84 period. Total income in these cities failed to keep pace with inflation. In the growing cities, real per capita income increased by 3.1 percent in low-growth areas, 1.35 percent in moderate-growth areas, and 2.4 percent for high-growth groups.

Figure 2.1.6 portrays the variation in the unemployment rate across growth classes. Cities with negative growth had an unemployment rate of 10.18 percent. The other three-city groups had unemployment rates of 7.03 percent (low-growth group), 7.44 percent (moderate-growth) and 7.2 percent (high-growth). Again, there is the pattern of a clear difference between the declining

group and all of the growing groups. Within the growth groups, however, there is no consistent alignment of lower growth rates with higher unemployment.

Figure 2.1.7 shows building permits. As expected, building permits vary closely with city growth rates. Thus, adjusted for city sizes, low-growth cities had an average of 3.1 more building permits per 1000 population than negative-growth cities. Permits in moderate-growth cities averaged nine more per 1000 than negative-growth cities. High-growth cities averaged about 17.6 per thousand, compared to only 2.4 per thousand for negative-growth cities.

Looking at 1980 statistics, we find that population growth significantly affects median housing values and rents (Figures 2.1.8 and 2.1.9). In the cities studied, those that grew most rapidly in the 1970s tended to have the highest average housing prices in 1980: \$50,528 for high growth, \$43,598 for moderate growth, \$43,687 for low growth, and \$44,494 for negative growth.

In 1980, rents followed the pattern of housing prices. Monthly rents averaged \$228 for negative-growth cities, \$231 for slow growth, \$224 for moderate, and \$241 for high growth.

Property taxes (Figure 2.1.10) are likely to be higher, the lower the rate of growth, with average per capita property tax of \$401 in cities experiencing negative growth in the 1970s. Slow-growth, moderate-growth and high-growth cities had per capita taxes of \$358, \$298, and \$269, respectively.

Figures 2.1.11 through 2.1.14 portray employment patterns in different growth-rate groups. Reflecting problems in the "rust belt" during the 1970s, areas experiencing negative or low growth have more employment in manufacturing (32 and 34 percent, respectively) than moderately growing areas (29 percent) and

rapidly growing areas (20 percent). It is likely that causation runs from the proportion of workers in manufacturing to the rate of employment growth.

Rapidly growing cities have the highest proportion of workers in government (21.75 percent), followed by the moderate growing group at eighteen percent, low-growth cities at 15.4 percent, and the negative-growth cities at 14.5 percent.

In retail trade, there is a differential of about two percent (11.03 percent over 9.12 percent) between the high-growth cities group and the negative-growth group. Accordingly, a rapid shift from high growth to negative growth could displace up to 18 percent of workers in retail trade (about 2 percent of total employment).

The *Metropolitan Area Data Book* combines construction employment, agriculture, and mining. Negative-growth cities had only 12.9 percent of employment in this category. The low-growth, moderate-growth, and high-growth groups had 13.3 percent, 15 percent, and 18.68 percent employment in this category, respectively. Therefore, a rapid shift from high to negative growth, could displace nearly one third of this category's employment, causing nearly six percent of workers to lose their jobs.

In summary of this phase of analysis of over three hundred United States cities, it appears that population decline will lead to reduced income, high unemployment, lower property values, and higher property taxes.

Phase 2

In Phase 1 of this analysis of the experience of other cities, we examined, with minor exceptions, the experience of cities between 1980 and 1984. Here in

Phase 2, we add to the static analysis a comparison of the growth characteristics of those cities over three separate periods: the 1960s, 1970s, and the period 1980 through 1984. For each period, we assigned growth labels according to the groups used in Phase I: High (H) - above twelve percent growth; Moderate (M), seven to twelve percent; Low (L), zero to six percent; and Negative (N). We placed cities in five groups according to their patterns of growth over the three periods: (1) High-High-Moderate (HHM); (2) High-High-Low (HHL); (3) High-"Open"-Negative (HON), in which "Open" means that there were insufficient cases to establish a middle group; (4) High-Moderate-Low (HML), which is to be expected in natural maturation process described in the introduction; and (5) Moderate-High-Low (MHL).

The intent of this analysis is to show what might happen in Las Vegas based on the growth experience in other cities. In particular, the analysis shows probable consequences of major departures from the growth-rate patterns inherent in the natural maturation of cities.

We examined the relationship between population growth and economic well-being (Table 2.2). The first economic well-being variable is unemployment (Figure 2.2.1). Serving as a benchmark, average unemployment rates across all of the groups in 1984 was 7.8 percent. In the HON group (cities that moved from high growth to negative growth over the three periods), the unemployment rate in 1984 was 9.6 percent. The MHL group, with an 8.8 percent rate, had the second highest unemployment at the end of the three periods. Unemployment rates for the HHM group and for the HML group were 7.7 percent and 6.4 percent. Two conclusions are reasonable. First, cities that experienced large shifts in population growth tend to have high unemployment rates and to do so for substantial periods of time after such shifts. Second, cities following the natural maturation pattern (HML) tend to have the lowest unemployment rate.

In respect to the percentage of the population below the poverty level (Figure 2.2.2), the MHL group is highest with 13.4 percent with HHL at 12.5 percent and HML at 10.8 percent. Surprisingly, the lowest fraction of poor people, at 9.6 percent, is in the HON group. At first glance, these results contradict the natural expectation that high-growth areas are prosperous. An explanation can be found in migrations for which Las Vegas provides a good example. High-growth areas will attract the poor while those who have established successful careers and other alignments in a community will remain even in a negative-growth area. Las Vegas has long had high unemployment rates and numbers of poor people because those seeking to better their situations move to communities with jobs.

Contrary to expectations, housing values (Figure 2.2.3) are not consistently and closely related to rates of city growth. While housing value averaged \$47,537 for all groups, values for HHM were \$58,723; for HHL, \$49,853; for HML, \$48,025; for HON, \$43,729; and for MHL, \$40,200. Among the many factors that affect housing prices is developer willingness and ability to add expeditiously to housing stocks. Cities that had twenty years of high growth (HHM and HHL) had significantly higher housing prices than those with only ten years of high growth. Occasionally in developments such as those for senior citizens, housing costs are more a cause than a result of changes in city growth.

Monthly housing rents (Figure 2.2.4) for the growth groups were \$250 for HHM, \$239 for HON, \$236 for HHL, \$230 for HML, and \$212 for MHL. The average across all groups was \$235. As expected, rents were highest in the city groups with twenty years of high growth. The high rent for the HON group (high to negative growth over the years) is an aberration. If building constrictions create negative growth, housing demand exceeds housing supply, and rents increase. For this group, 29.4 percent of housing was constructed before 1940, with only 21.9 percent built after 1970.

Our analysis of the five different groups of cities by their growth patterns over twenty-four years produces some interesting results for specific industries. Thus, manufacturing as a percent of total output (Figure 2.2.5) is lowest in high-growth cities, with percentages for HHM of only 18.3; for HHL, 24.5; for MHL, 30.2; and for, HON 41.1. Among the probable cause of this result is the relatively low cost and availability of labor in the low-growth areas, and perhaps even more importantly, the large sunk costs involved in factories. This set of factors results in a reluctance to move when the economy of a community declines. Manufacturing declined in the 1970s and early 1980s. Those cities without substantial manufacturing and those that aggressively replaced lost manufacturing jobs suffered the least from this decline.

The percent of earnings from services (Figure 2.2.6) is higher in cities with stable or smoothly changing growth rates. The percentage of jobs in service industries is 19.3 for HML, 18.7 for HHM, 16.9 for HHL, 16.4 for HON, and a nearly identical 16.3 for MHL. Rapidly growing cities tend to have higher proportions of workers in construction and government. As a city matures, resources gravitate from accommodating more people to producing amenities for a stable, affluent population. A corollary is that service employment is less sensitive to disruption in growth than are construction and government employment.

Government fractions of earnings (Figure 2.2.7) differ among the five city groups. HHM and HHL have the highest government earnings fractions at 23.9 percent and 22.5 percent, respectively. The government fractions for MHL and HML are significantly lower at percentages of 19.5 and 18.5. HON has the lowest government earnings fraction at 14.4 percent. We conclude from the data that government substitutes for manufacturing in the economic base of many cities.

In percent of earnings for the data category that combines agriculture, mining, and construction ("other" in Table 2.2), employment in these industries, shown in Figure 2.2.8 is 19 percent for HHM, 15 percent for MHL, 14.8 percent for HHL, and 13.2 percent for HML. This result implies that population-driven construction during a period of high growth can give way to amenity construction for prosperous, mature cities. However, cities encountering unforeseen growth impediments would experience a precipitous decline in construction activity and construction employment.

Housing vacancy rates (Figure 2.2.9), surprisingly, show the highest rates for HHM at 7.2 percent (vacancy rates are high when construction leads population growth). Vacancy rates are 6.3 percent for both HHL and MHL, 5.9 percent for HML, and a low 5.2 percent for HON. Low vacancy rates mean deficient supply caused by inadequate construction in stagnant cities.

Per capita local government property taxes (Figure 2.2.10) were highest for the group ending with negative growth (HON) at \$402. Other group taxes were \$321 for HML, \$272 for HHM, \$266 for HHL, and \$211 for MHL. These results imply that residential property will tend to bear a disproportionate tax burden in cities making a rapid transition from high to negative growth. This could possibly be due to the reduction in the commercial and industrial property tax base.

Building permits (Figure 2.2.11), as expected, were highest for the HHM group at twelve per thousand population. Building permit numbers (per 1,000 people) were 7.4 for HHL, 7.3 for HML, 3.8 for MHL, and a low 2.2 for HON. These results are very much as should be expected from the close relationship between rates of growth and the willingness of developers to increase housing supplies. To an important extent, building not only responds to growth but also

creates it. Construction activity attracts mobile construction workers, who increase in the demand for housing.

Migration to cities from other parts of the that state (Figure 2.2.12) was highest for the HHM Group at 14.7. Percentages for the other groups were 13.1 for HHL, 10.4 for HML, 9.6 for MHL, and 7.5 for HON. The results are expected.

The analysis in Phase 2, which is based on the pattern of change of rates of growth over twenty-four years, shows a variety of results, most of which support our expectations. Some results, however, appear to contradict expectations, but these are quite readily explained. HML, that group of cities characterized by natural maturation, has the lowest unemployment, below-average vacancy rates, below-average property taxes, and about-average building permits per thousand population.

Conclusions

In its study of other cities, this section shows the strong relationship between the natural maturation growth pattern and community well being. In general, the slowing of city growth outside the pattern of natural maturation has lead to reduced income, higher unemployment, reduced construction, lower property values and higher property taxes. Those cities which followed the pattern of natural maturation had low unemployment rates, below-average housing vacancy rates and about-average building activity.

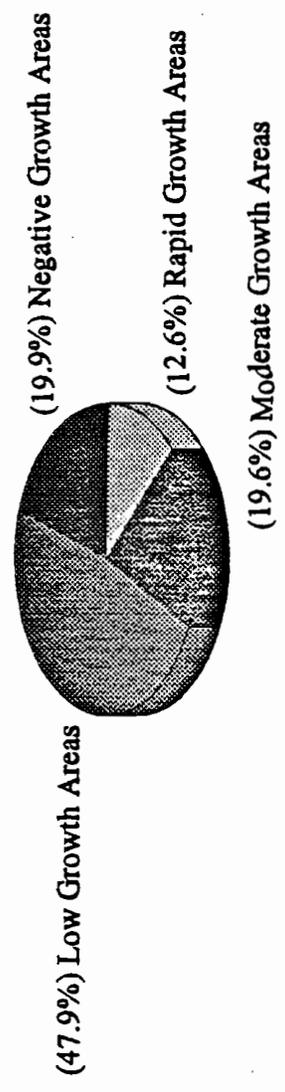
Table 2.1

Descriptive Statistics, 312 Metropolitan Areas

Growth Period	PERCENTAGE OF MSA'S IN GROWTH CATEGORY	WEIGHTED AVERAGE POPULATION GROWTH	1984 PER CAPITA INCOME (1984 \$)	CHANGE IN PER CAPITA INCOME 1980-84 (1984 \$)	PERCENT CHANGE IN PER CAPITA INCOME (1984 \$)	UNEMPLOYMENT RATES 1984	BUILDING PERMITS (PER 1000)	PERCENT OF GOVERNMENT EXPENDITURES ON PUBLIC WELFARE 1982	PERCENT OF GOVERNMENT EXPENDITURES ON HEALTH & HOSPITALS 1982
1980 through 1984									
Negative Growth Areas	20	-1.94	\$10,803	\$1,637	-2.40%	10.18%	2.4	6.63	8.30
Low Growth Areas	48	2.8	\$11,396	\$2,240	3.10%	7.03%	5.8	4.18	6.80
Moderate Growth Areas	19.7	9.4	\$11,359	\$2,075	1.35%	7.44%	11.4	4.33	6.98
Rapid Growth Areas	12.6	21.6	\$11,440	\$2,177	2.40%	7.20%	17.8	2.91	6.62

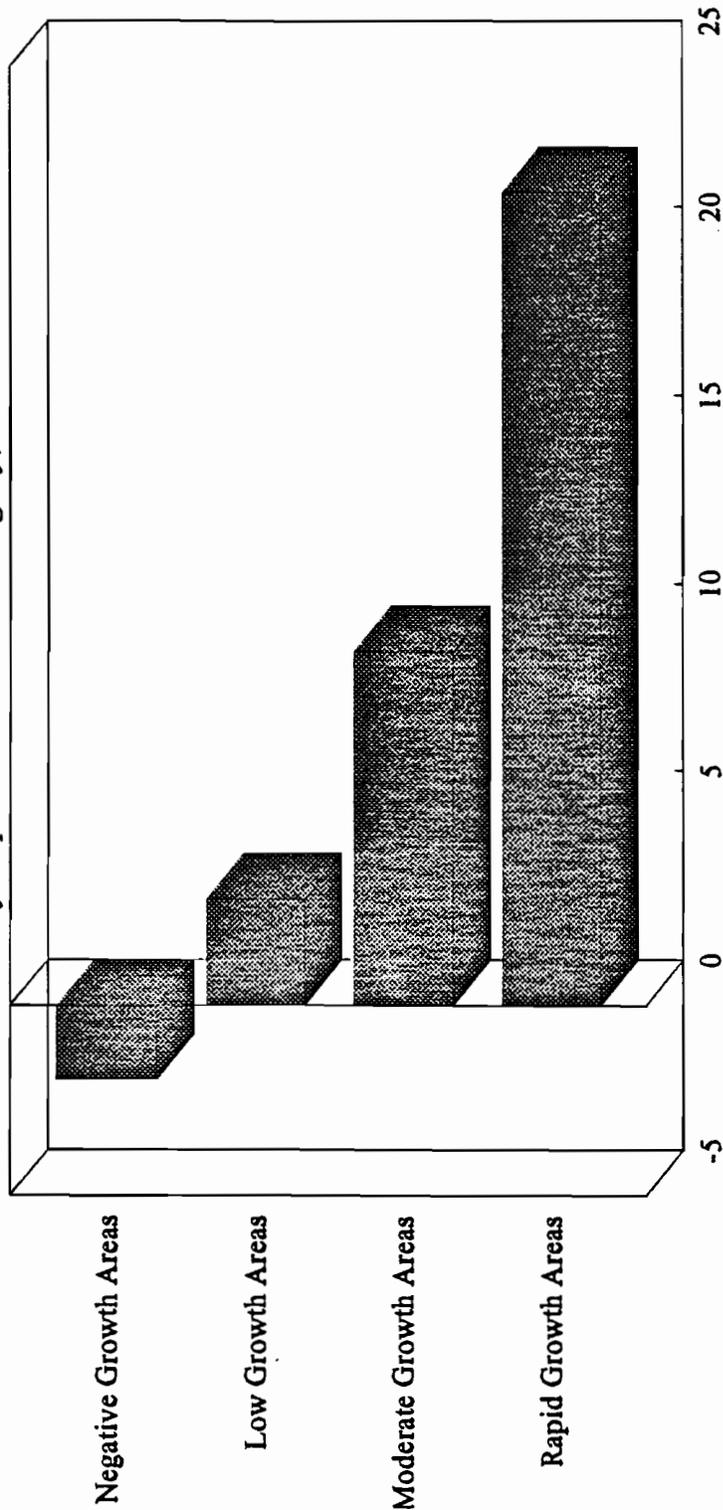
Growth Period	MEDIAN HOUSING VALUE (1980 \$)	MEDIAN GROSS RENT (1980 \$)	PER CAPITA LOCAL PROPERTY TAXES (1980 \$)	VACANCY RATE 1980	PERCENT OF EARNINGS FROM MANUFACTURING 1983	PERCENT OF EARNINGS FROM GOVERNMENT 1983	PERCENT OF EARNINGS FROM RETAIL CONSTRUCTION 1983	PERCENT OF EARNINGS FROM AGRICULTURE MINING & CONSTRUCTION 1983	TRANSFER PAYMENTS (MILLIONS OF 1983 \$)
1970 through 1980									
Negative Growth Areas	\$44,494	\$228.48	\$400.74	8.5%	32%	14.53%	9.12%	12.91%	\$2,829
Low Growth Areas	\$43,687	\$230.51	\$358.13	8.7%	34%	15.38%	9.20%	13.29%	\$850
Moderate Growth Areas	\$43,598	\$223.88	\$297.60	6.1%	29%	18.04%	9.84%	18.09%	\$1,082
Rapid Growth Areas	\$50,528	\$241.11	\$299.19	7.8%	20%	21.75%	11.03%	18.68%	\$691

Figure 2.1.1 Distribution of Growth Classes 312 Metropolitan Areas, 1980-1984



Source:
State and Metropolitan Area Data Book, 1986, Table A

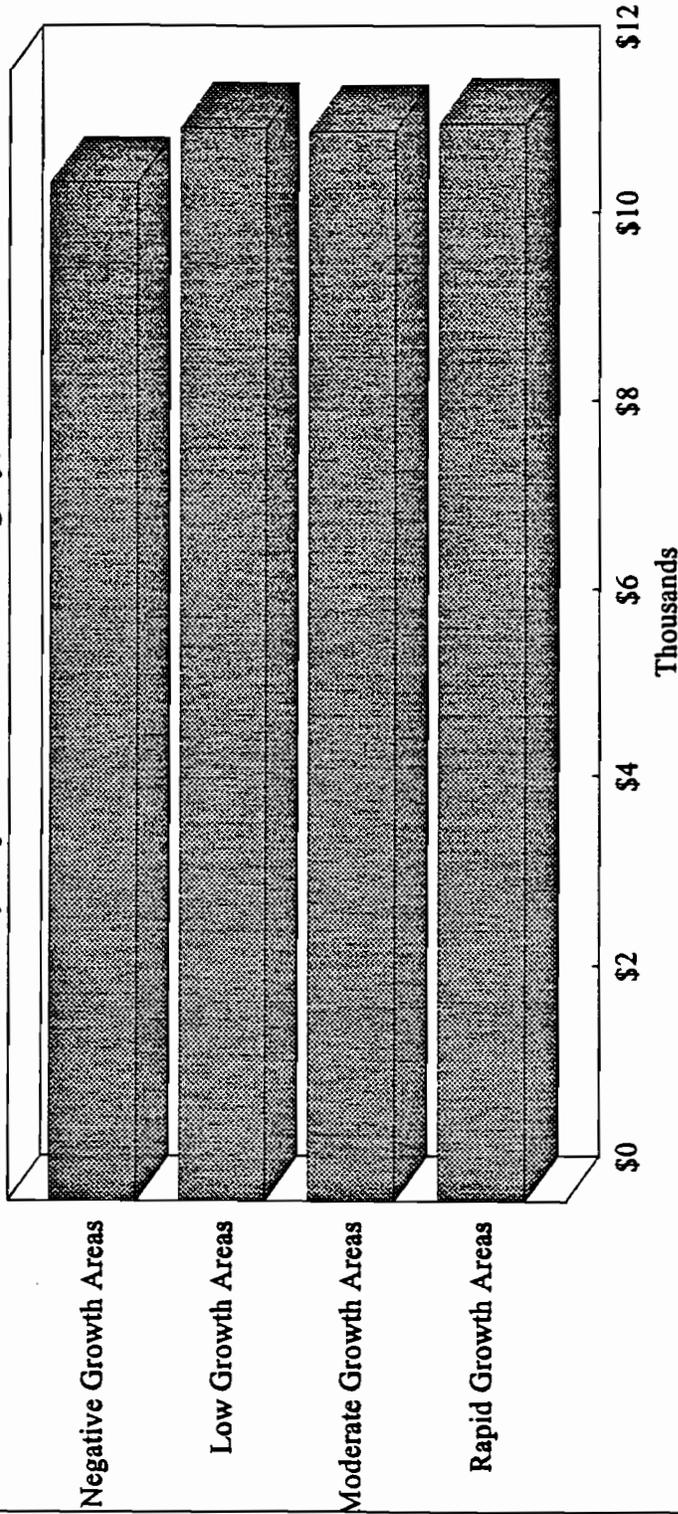
Figure 2.1.2
Weighted Average Population Growth, 1980-1984
 By Population Growth Category, 1980-1984



Source:
 State and Metropolitan Area Data Book, 1986, Table A

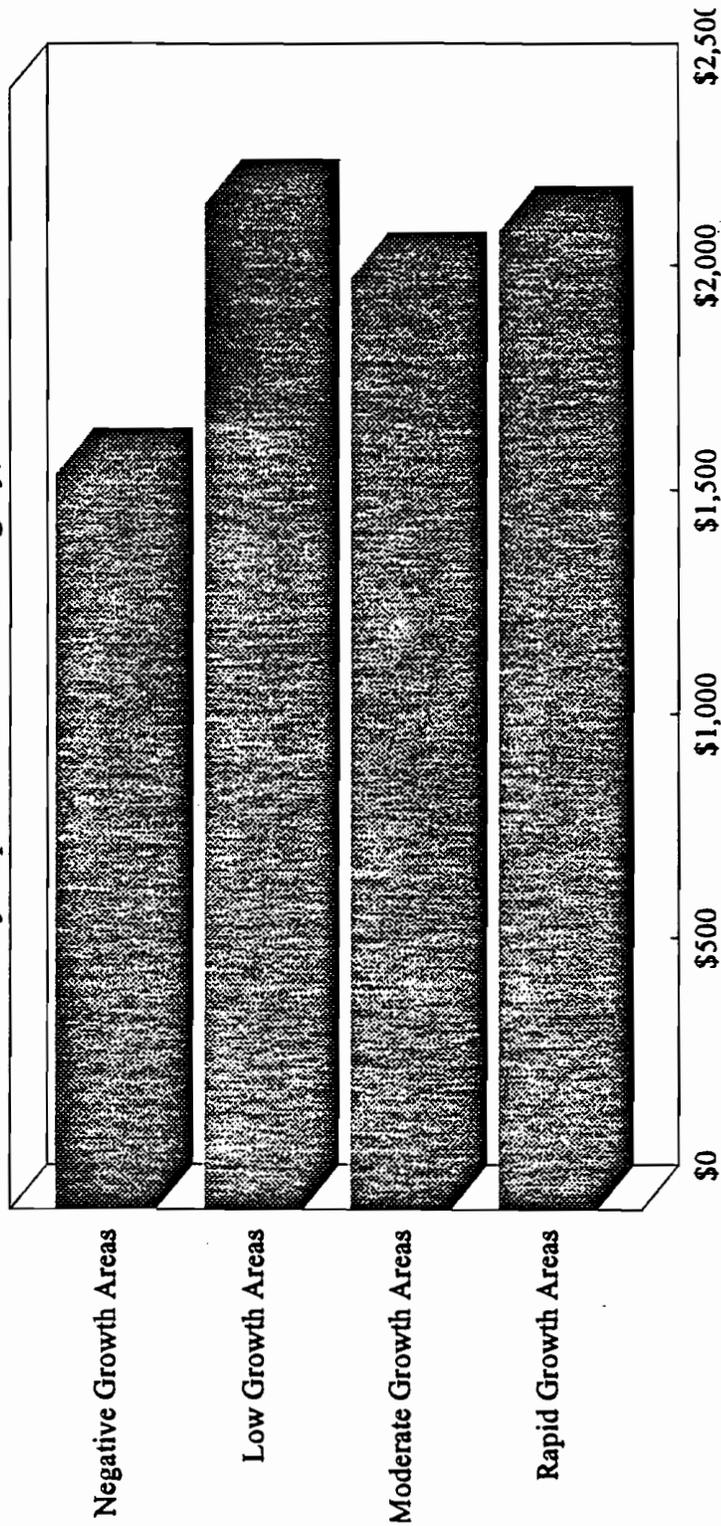
Figure 2.1.3 Per Capita Income, 1983

By Population Growth Category, 1980-1984



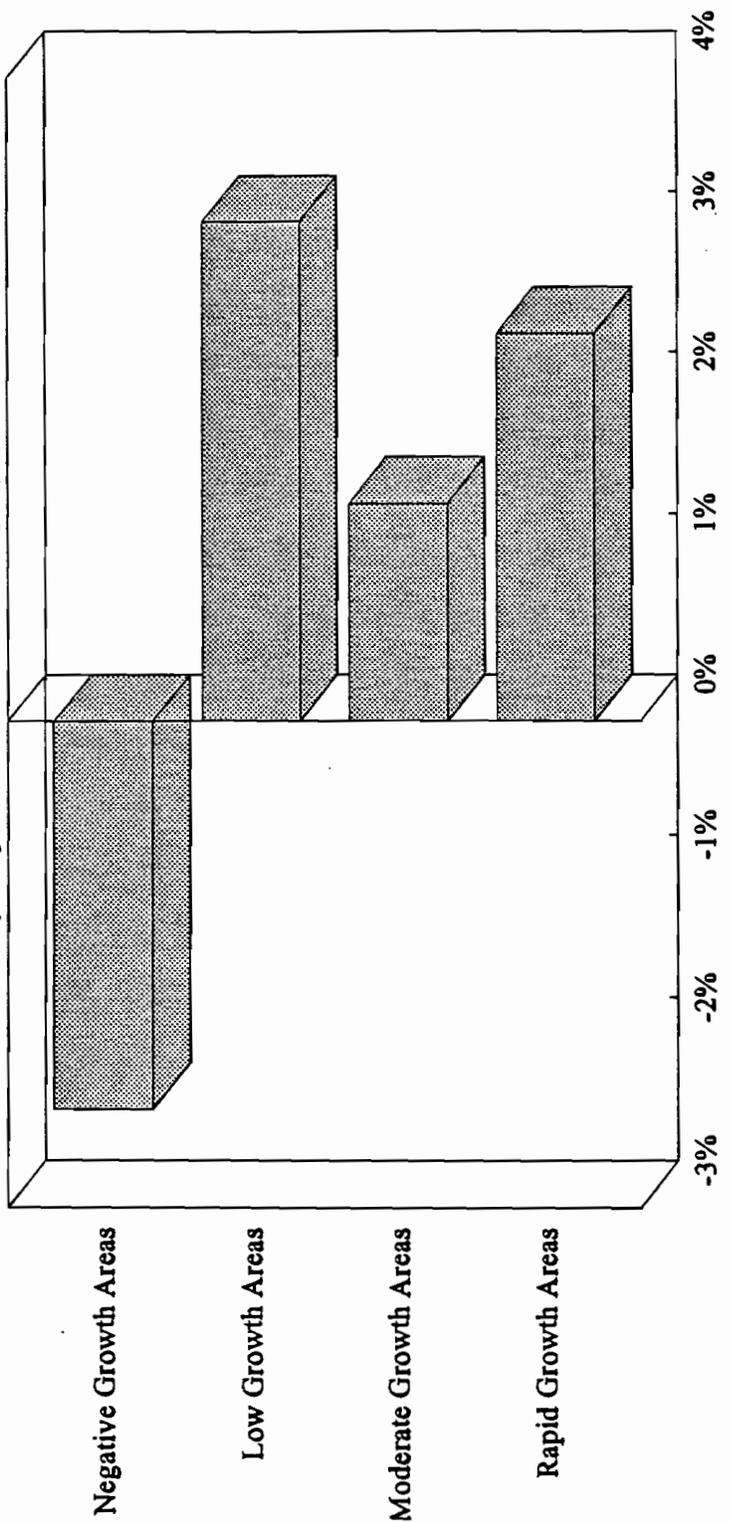
Source:
State and Metropolitan Area Data Book, 1986, Table A

Figure 2.1.4
Change in Per Capita Income, 1980-1984
 By Population Growth Category, 1980-1984



Source:
 State and Metropolitan Area Data Book, 1986, Table A

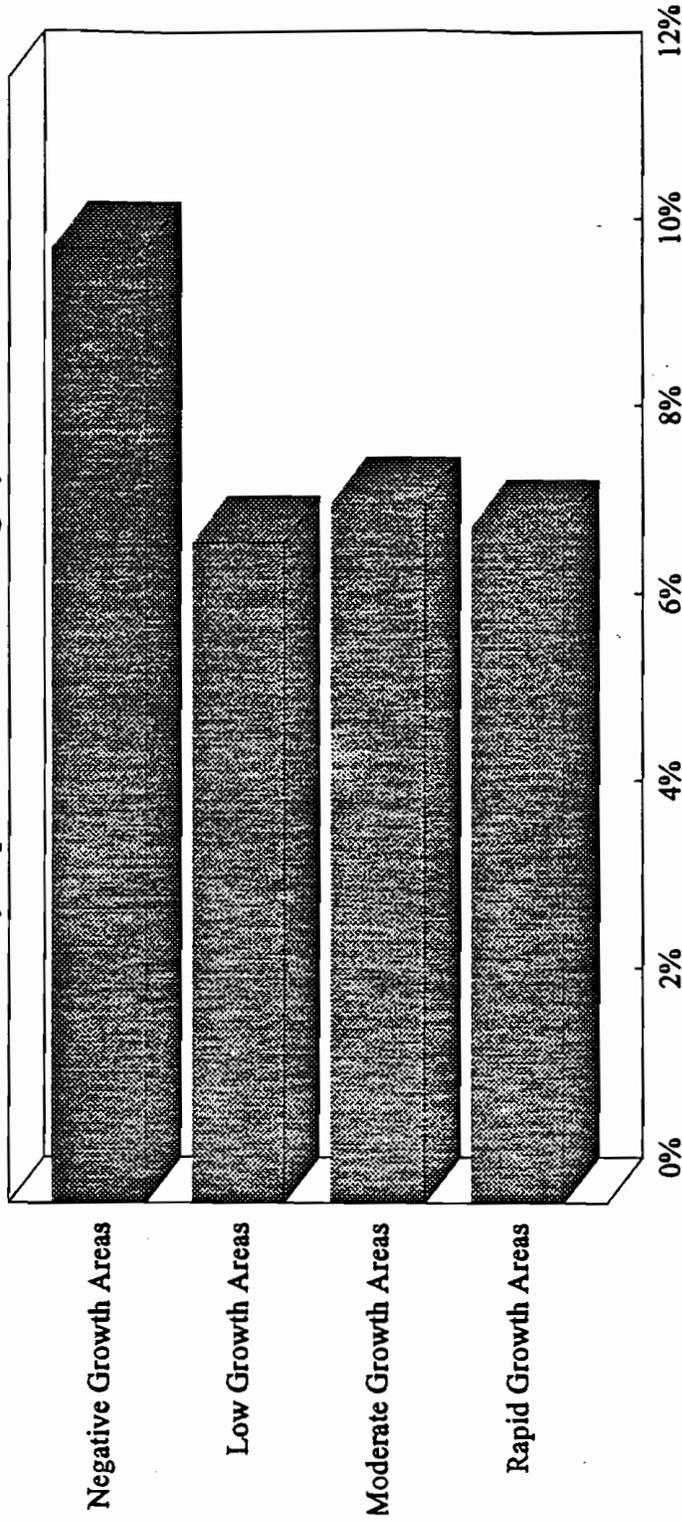
Figure 2.1.5
Percent Change in Per Capita Income, 1980-1984
 By Population Growth Category, 1980-1984



Source:
 State and Metropolitan Area Data Book, 1986, Table A

Figure 2.1.6 Unemployment Rates, 1984

By Population Growth Category, 1980-1984

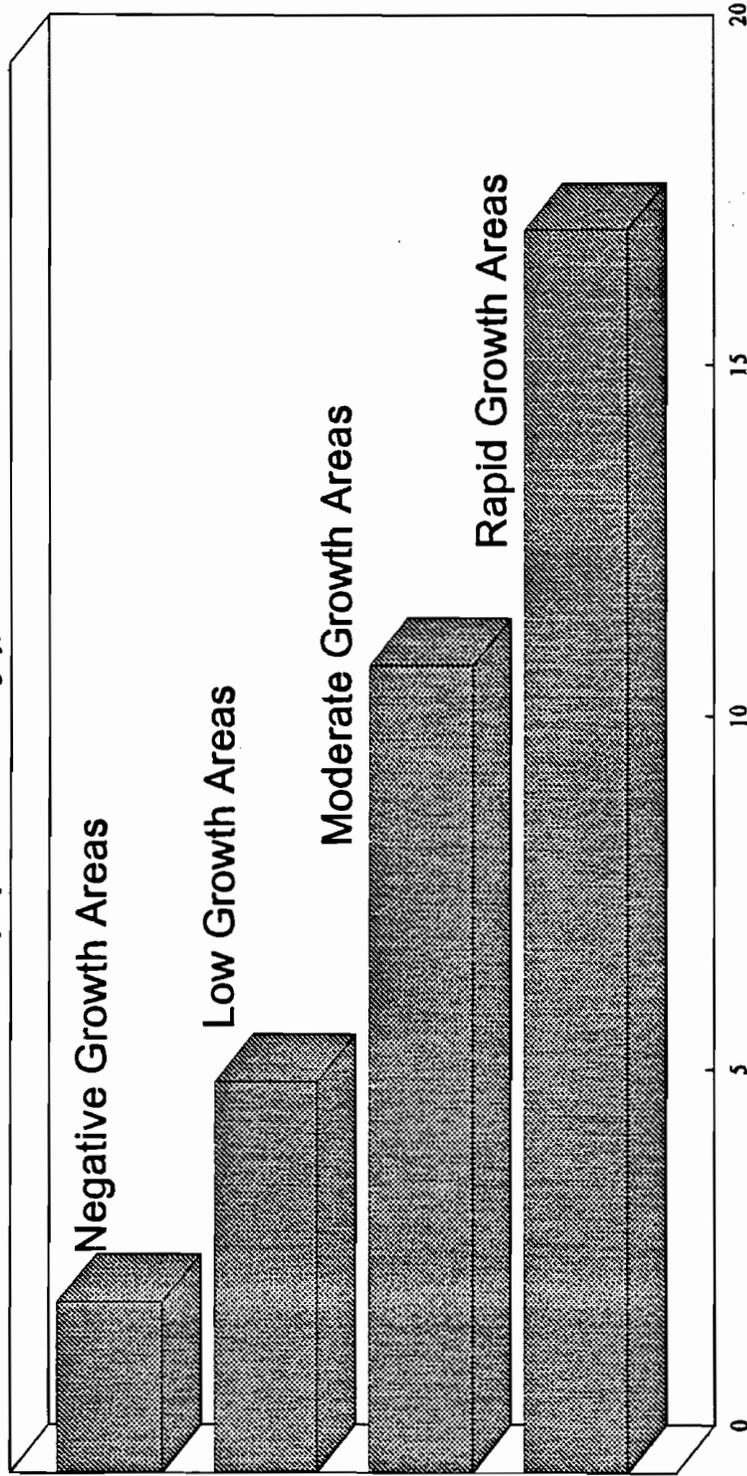


Source:
State and Metropolitan Area Data Book, 1986, Table A

Figure 2.1.7

Building Permits per 1,000 Population, 1984

By Population Growth Category, 1980-1984

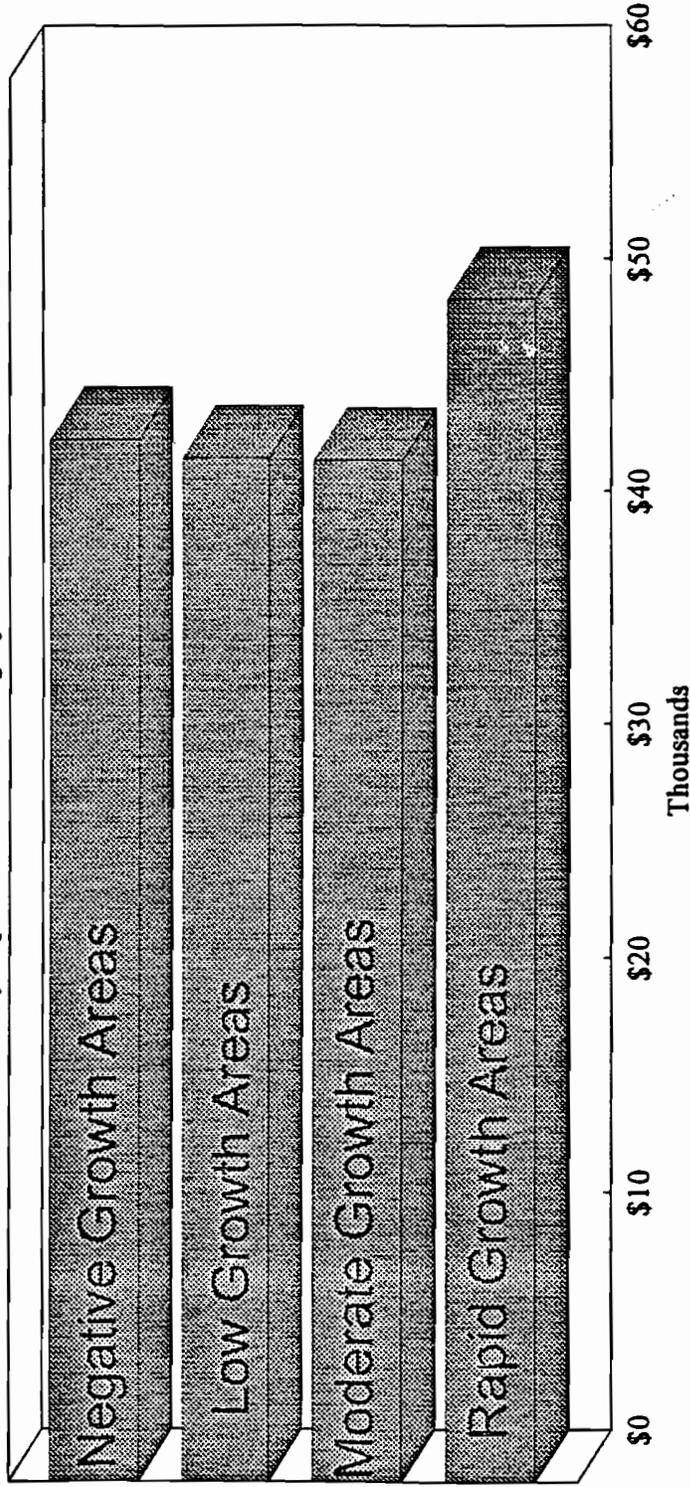


Source:

State and Metropolitan Area Data Book, 1986, Table A

Figure 2.1.8 Median Housing Values, 1980

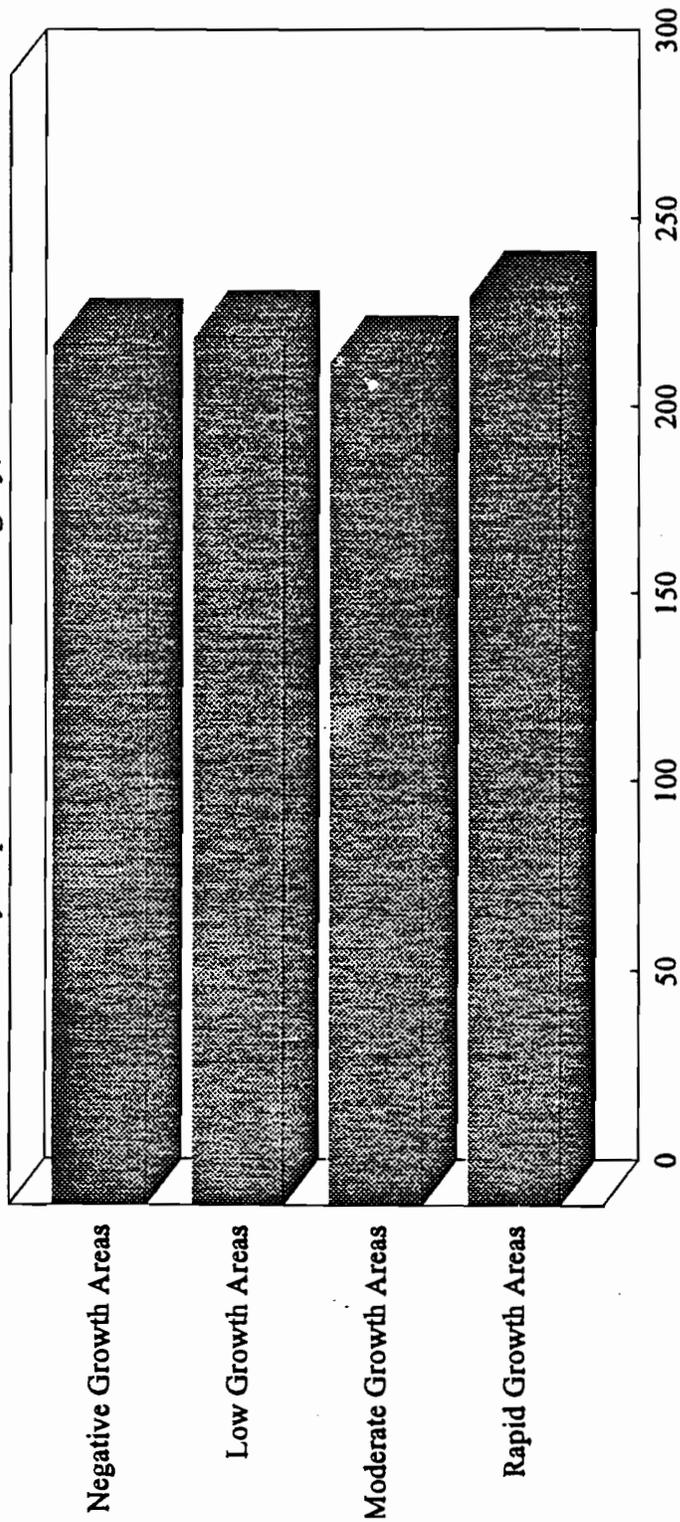
By Population Growth Category 1970-1980



Source:
State and Metropolitan Area Data Book, 1986, Table A

Figure 2.1.9 Median Rent, 1980

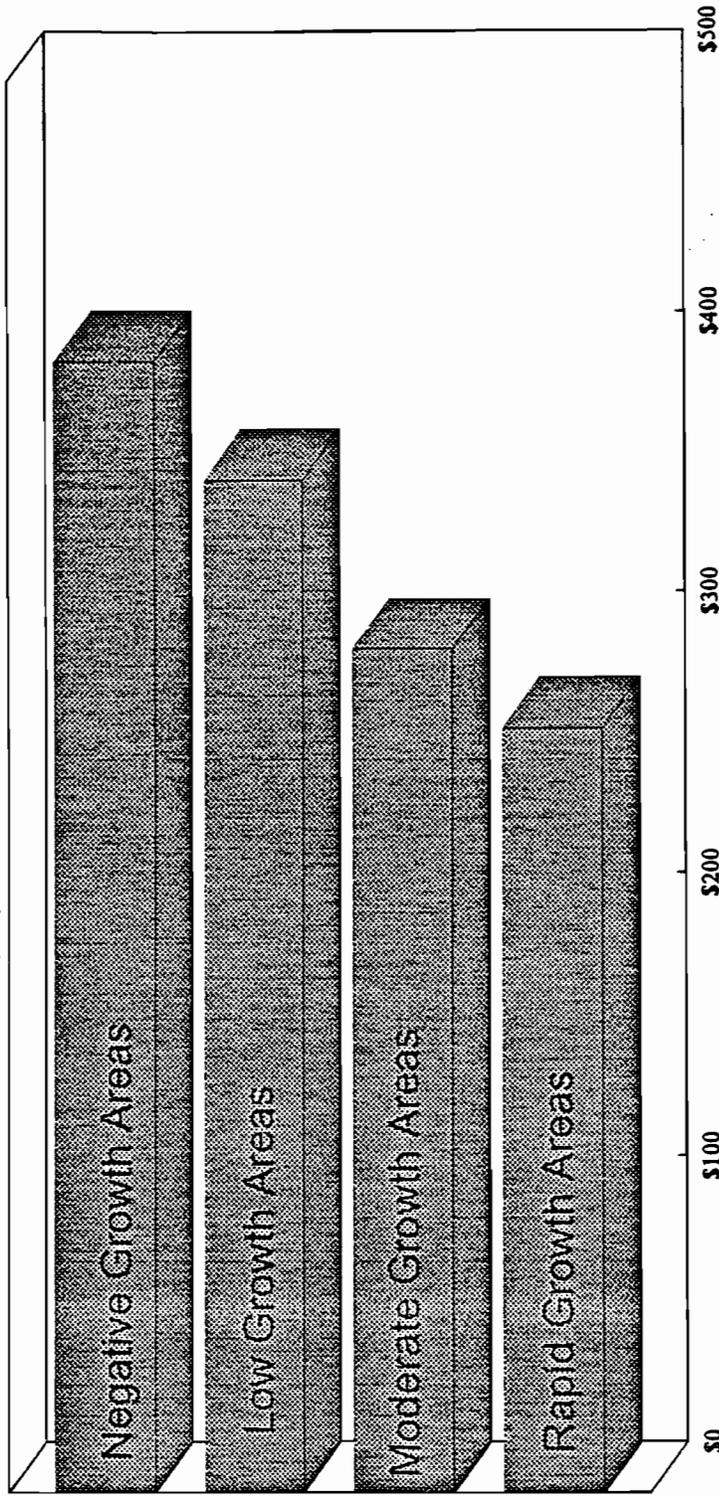
By Population Growth Category, 1970-1980



Source:
State and Metropolitan Area Data Book, 1986, Table A

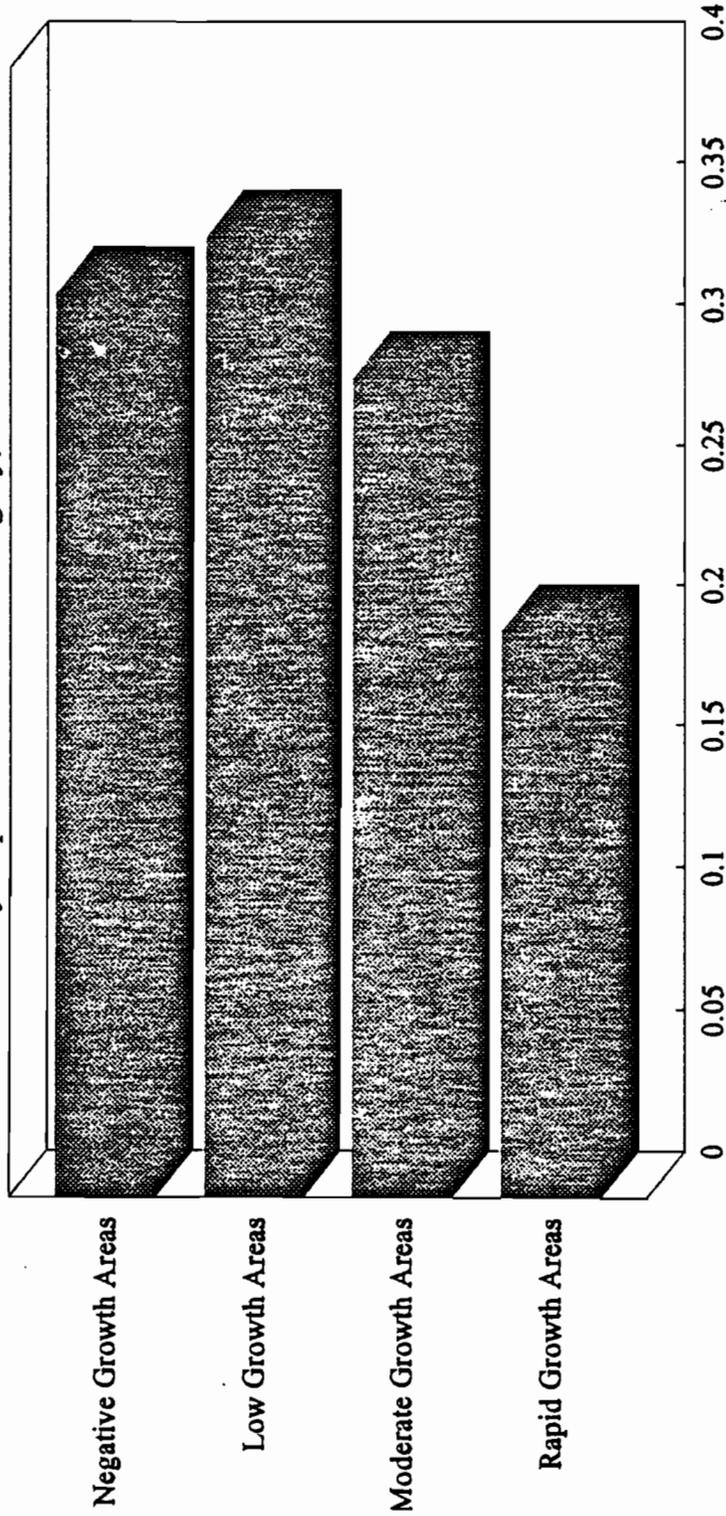
Figure 2.1.10 Per Capita Local Property Taxes, 1980

By Population Growth Category, 1970-1980



Source:
State and Metropolitan Area Data Book, 1986, Table A

Figure 2.1.11
Percent of Earnings from Manufacturing, 1983
 By Population Growth Category, 1970-1980

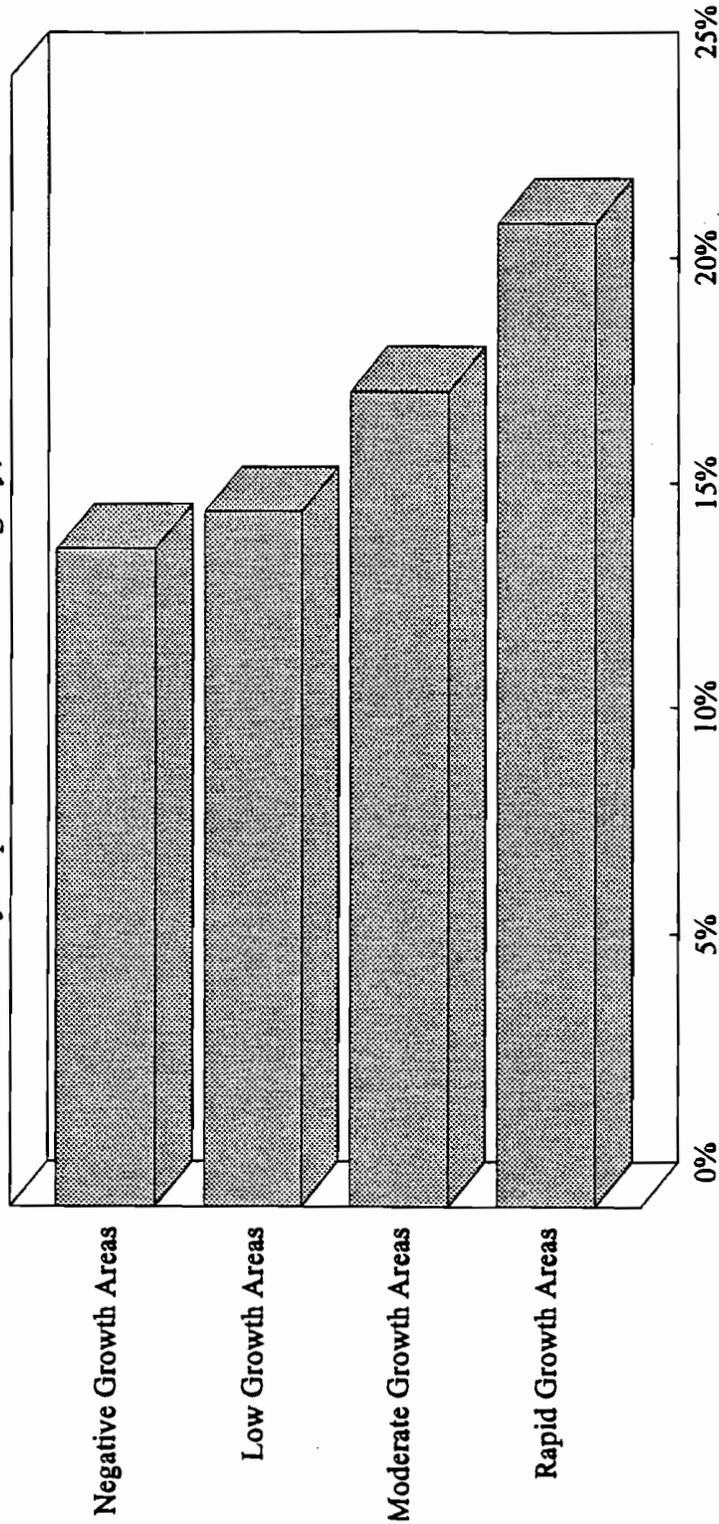


Source:
 State and Metropolitan Area Data Book, 1986, Table A

Figure 2.1.12

Percent of Earnings from Government, 1983

By Population Growth Category, 1970-1980

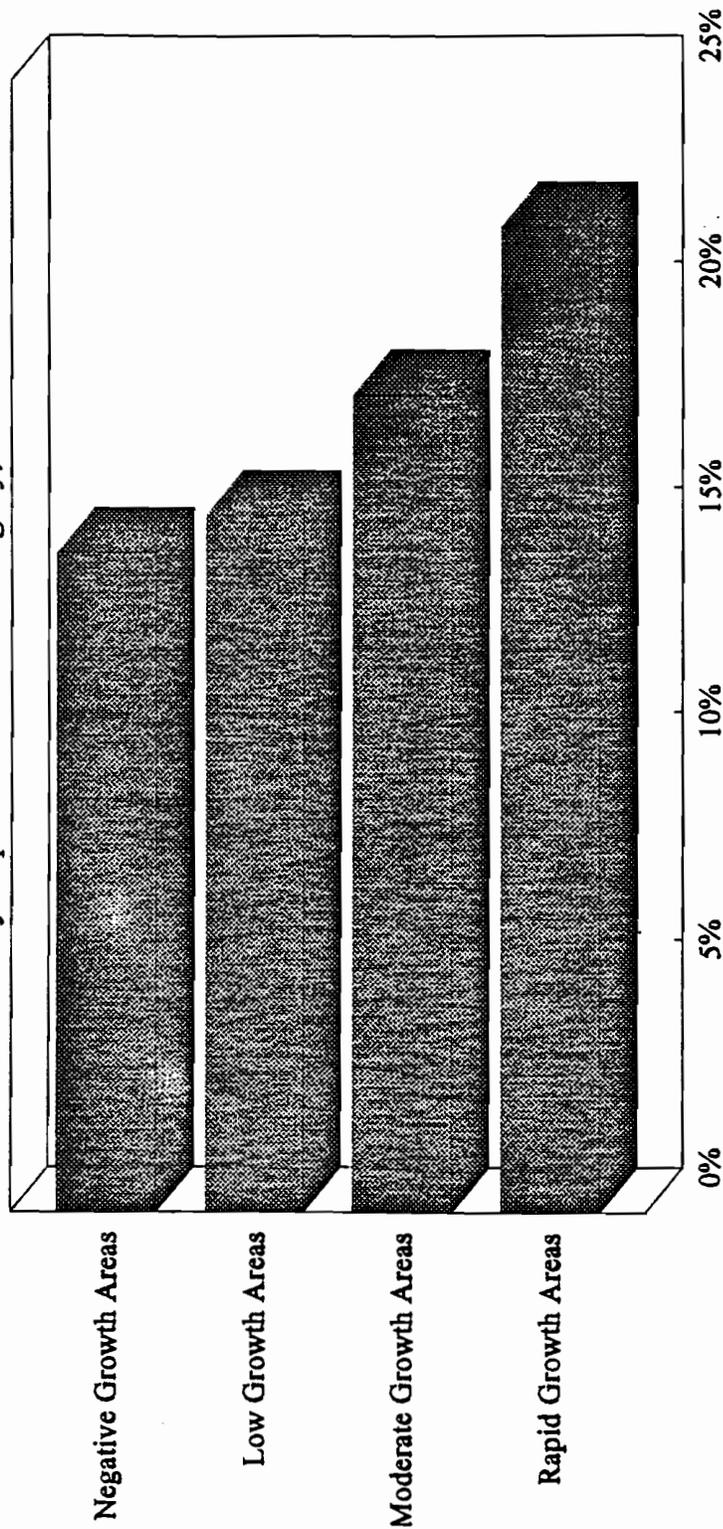


Source:
State and Metropolitan Area Data Book, 1986, Table A

Figure 2.1.13

Percent of Earnings from Retail Industries, 1983

By Population Growth Category, 1970-1980

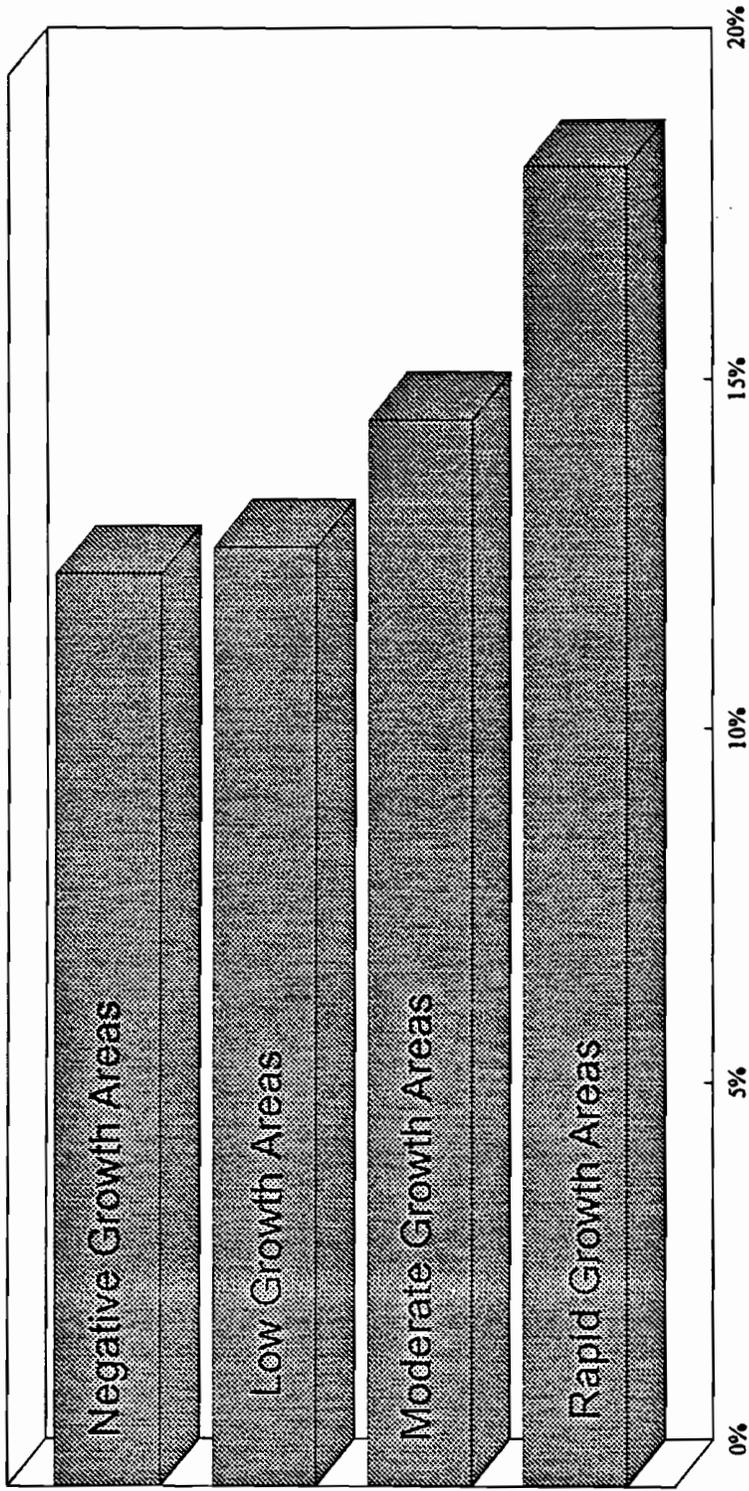


Source:
State and Metropolitan Area Data Book, 1986, Table A

Figure 2.1.14

Percent of Earnings from Agriculture, Mining and Construction, 1983

By Population Growth Category, 1970-1980



Source:

State and Metropolitan Area Data Book, 1986, Table A

Table 2.2

Descriptive Statistics for 312 Urban Areas
Grouped by Growth Patterns from 1960 to 1984

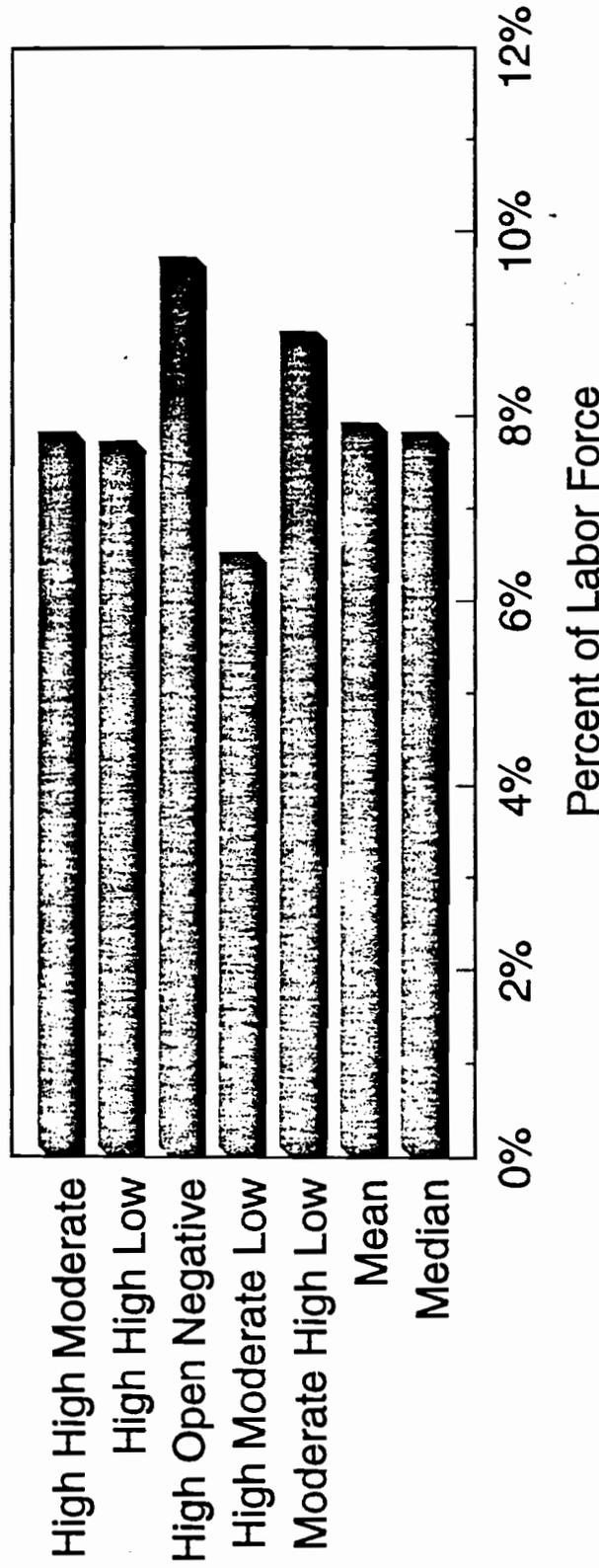
	Growth: 1960-1970 Growth: 1970-1980 Growth: 1980-1984	HIGH HIGH MODERATE	HIGH HIGH LOW	HIGH OPEN NEGATIVE	HIGH MODERATE LOW	MODERATE HIGH LOW
UNEMPLOYMENT RATE 1984	7.7%	7.8%	7.6%	9.6%	6.4%	8.8%
MIGRATION FROM IN STATE	14.7%	13.1%	13.1%	7.5%	10.4%	9.6%
HOUSING VALUE	\$58,723	\$49,853	\$49,853	\$43,729	\$48,025	\$40,200
RENT	\$250	\$238	\$238	\$239	\$230	\$212
VACANCY RATE	7.2%	6.3%	6.3%	5.2%	5.9%	6.3%
PERCENT MANUFACTURING	18.3%	24.5%	24.5%	41.1%	28.3%	30.2%
PERCENT SERVICES	18.7%	16.9%	16.9%	16.4%	19.3%	16.3%
PERCENT WHOLESALE	5.0%	6.0%	6.0%	4.7%	5.5%	5.0%
PERCENT RETAIL	11.0%	10.2%	10.2%	9.0%	9.6%	9.9%
PERCENT GOVERNMENT	23.9%	22.5%	22.5%	14.4%	18.5%	19.5%
PERCENT OTHER	19.0%	14.8%	14.8%	11.1%	13.2%	15.0%
BUILDING PERMITS PER 1000	12	7.4	7.4	2.2	7.3	3.8
CHANGE IN LABOR FORCE 1984	2.08%	1.84%	1.84%	0.05%	2.88%	0.15%
PERCENT POVERTY	12.3%	12.5%	12.5%	9.6%	10.6%	13.4%
PER CAPITA PROPERTY TAXES	\$272	\$268	\$268	\$402	\$321	\$211
PERCENT BUILDING BEFORE 1940	13.3%	19.3%	19.3%	29.4%	23.8%	21.2%
PERCENT BUILDING AFTER 1970	37.6%	32.5%	32.5%	21.9%	26.6%	31.6%

	MEAN	MEDIAN
UNEMPLOYMENT RATE 1984	7.8%	7.7%
MIGRATION FROM IN STATE	11.1%	10.4%
HOUSING VALUE	\$47,537	\$48,025
RENT	\$235	\$236
VACANCY RATE	6.9%	6.2%
PERCENT MANUFACTURING	28.5%	28.3%
PERCENT SERVICES	18.6%	16.9%
PERCENT WHOLESALE	5.7%	5.1%
PERCENT RETAIL	10.3%	9.6%
PERCENT GOVERNMENT	19.2%	19.5%
PERCENT OTHER	16.4%	14.8%
BUILDING PERMITS PER 1000	7.4	7.3
CHANGE IN LABOR FORCE 1984	1.34%	1.54%
PERCENT POVERTY	11.9%	12.3%
PER CAPITAL PROPERTY TAXES	\$305	\$272
PERCENT BUILDING BEFORE 1940	21.4%	21.2%
PERCENT BUILDING AFTER 1970	30.0%	31.6%

Note: All figures for 1984 unless otherwise noted.

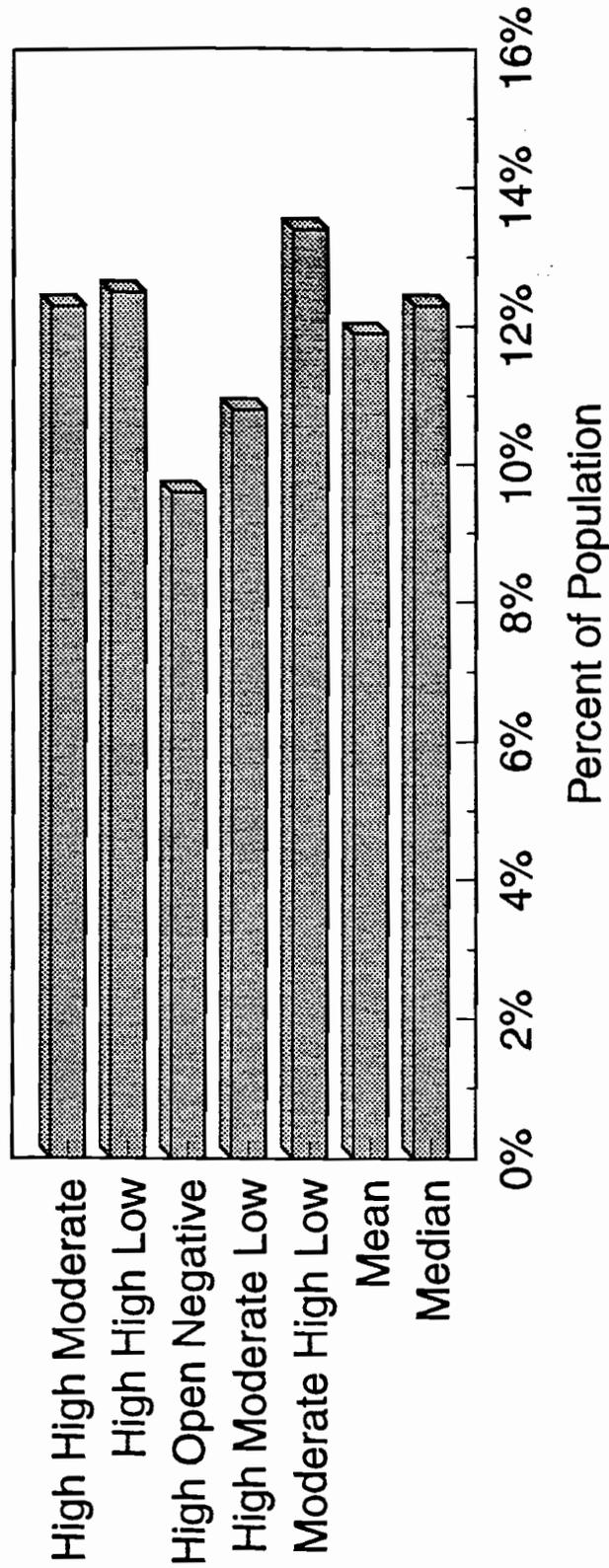
Source: The City and County Data Book, 1986.

Figure 2.2.1 Unemployment Rates, 1984 by Growth Scenario, 1960-1984



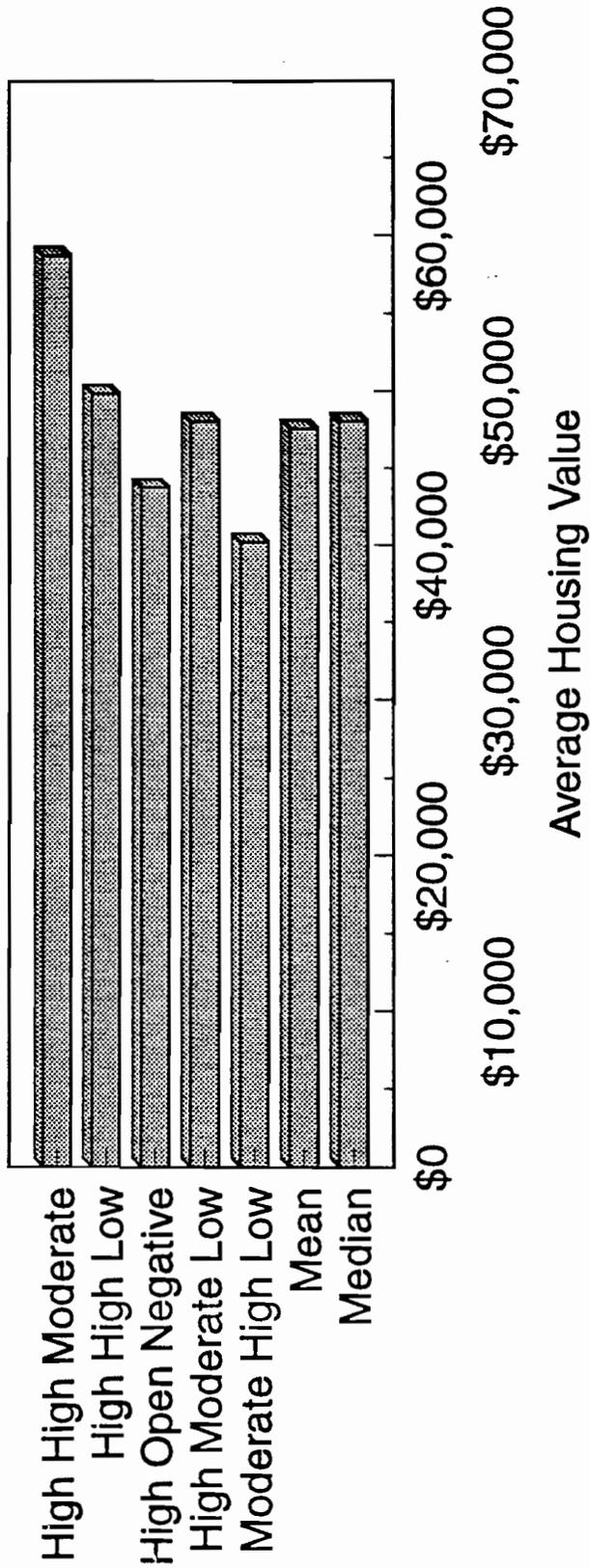
by Growth Scenario, 1960-1984
Table 2.2

Figure 2.2.2
Percent of Population Living in Poverty
by Growth Scenario, 1960-1984



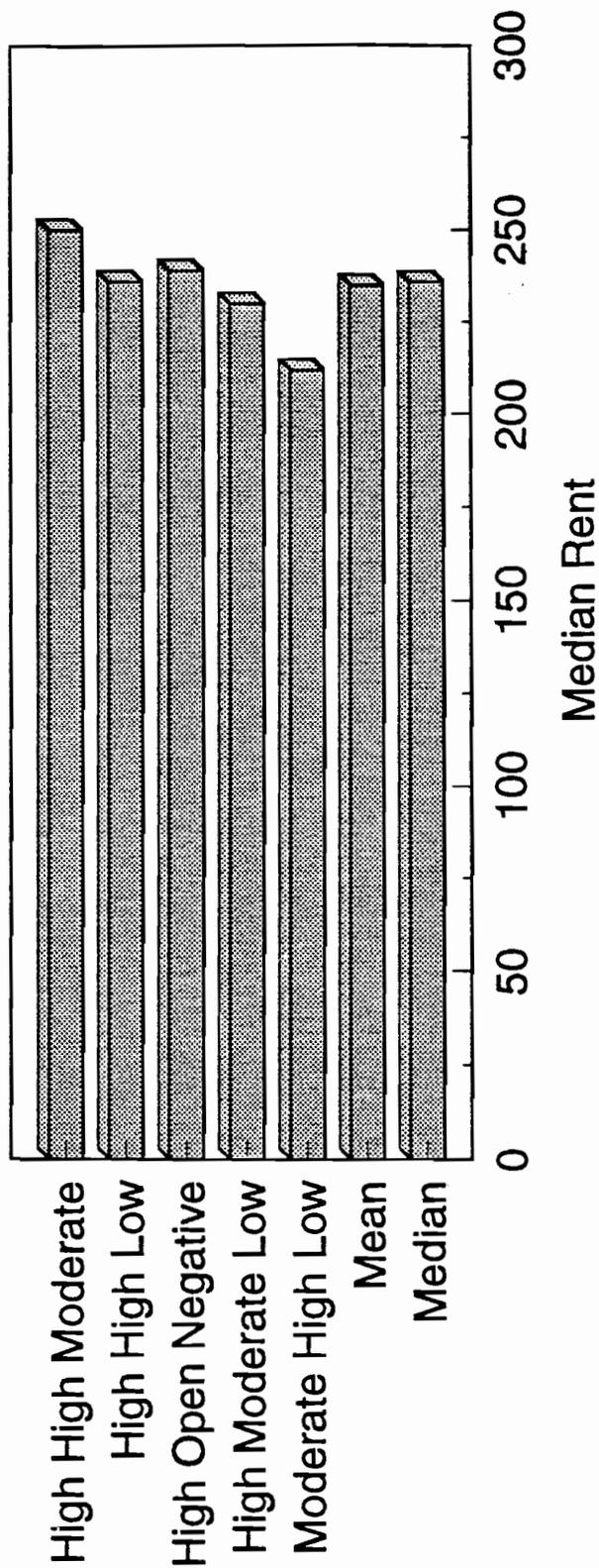
Source:
 Table 2.2

Figure 2.2.3
Average Values of Owner-Occupied Housing
by Growth Scenario, 1960-1984



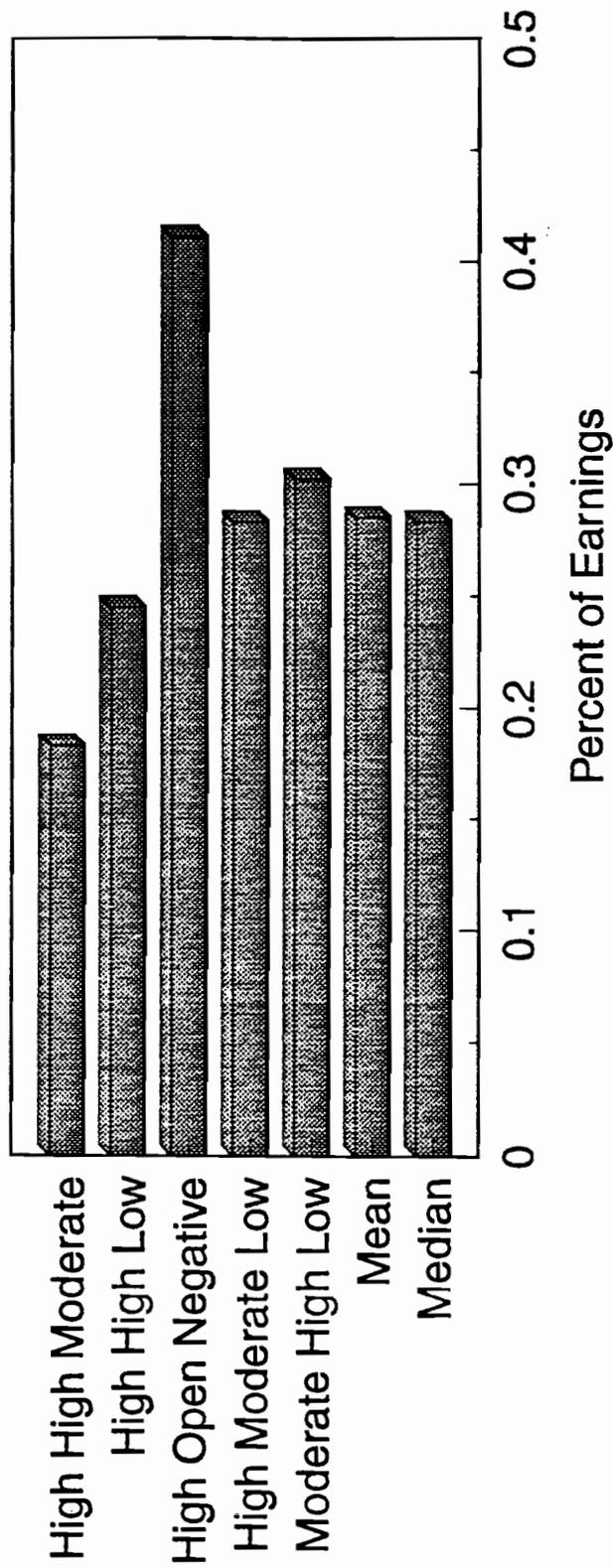
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Figure 2.2.4
Median Rents
by Growth Scenario, 1960-1984



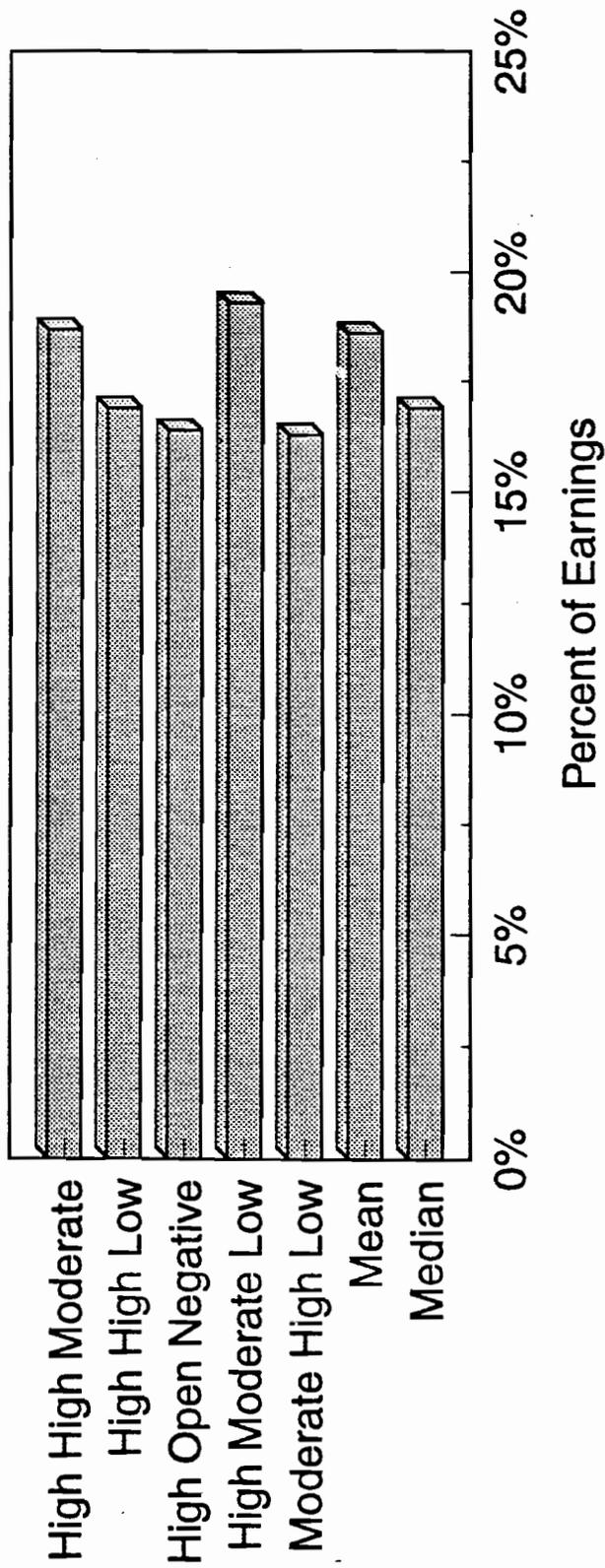
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Figure 2.2.5
Percent of Earnings from Manufacturing, 1984
by Growth Scenario, 1960-1984



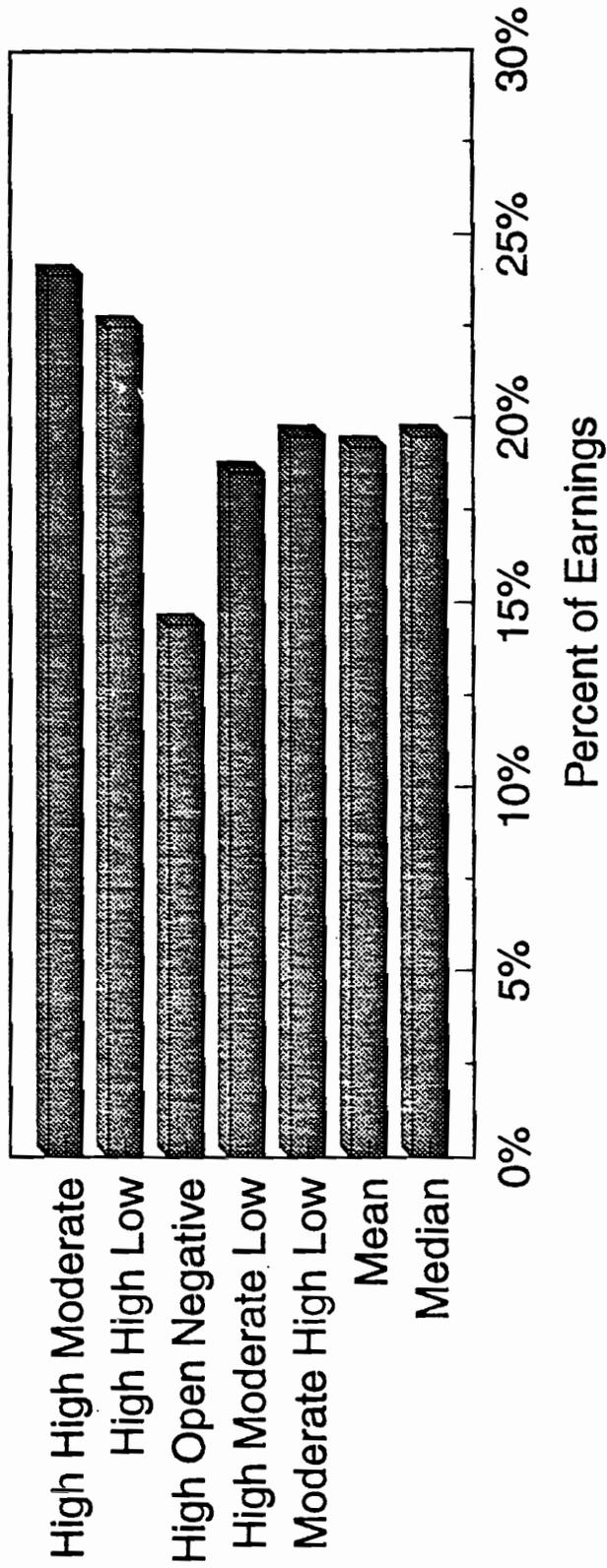
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Figure 2.2.6
Percent of Earnings from Services
by Growth Scenario, 1960-1984



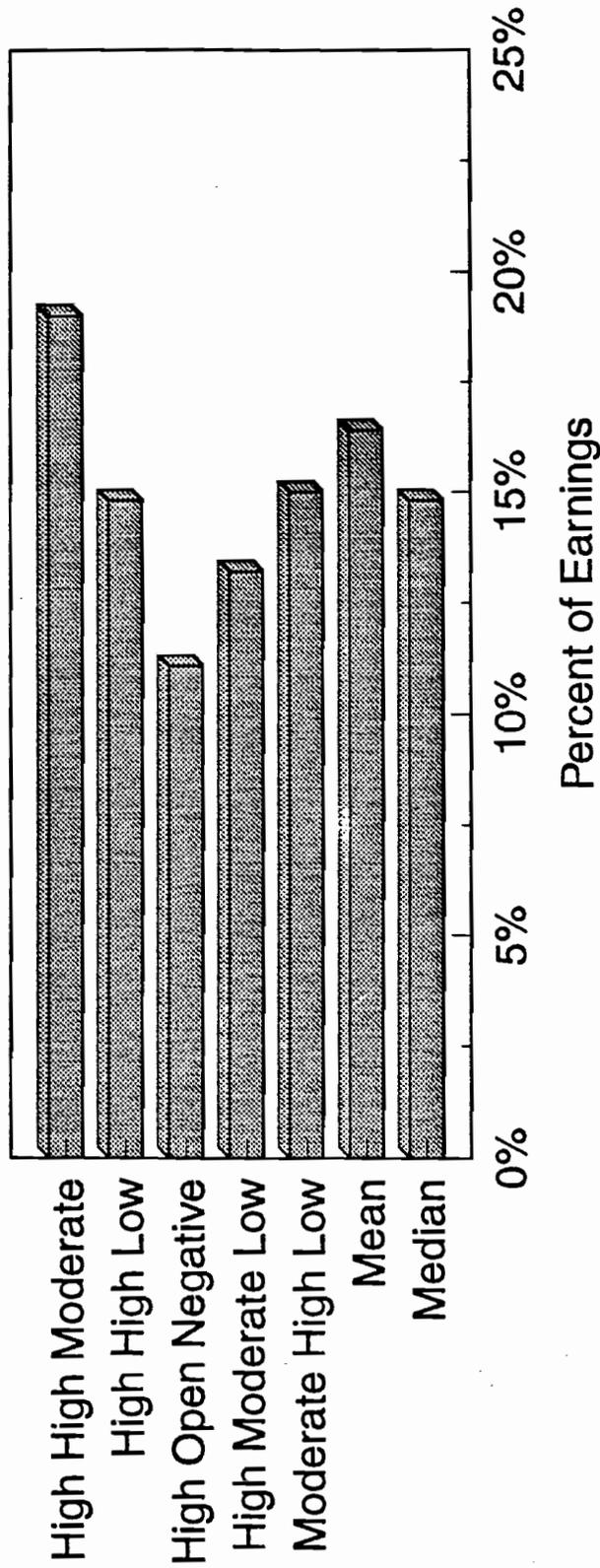
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Figure 2.2.7
Percent of Earnings from Government
by Growth Scenario, 1960-1984



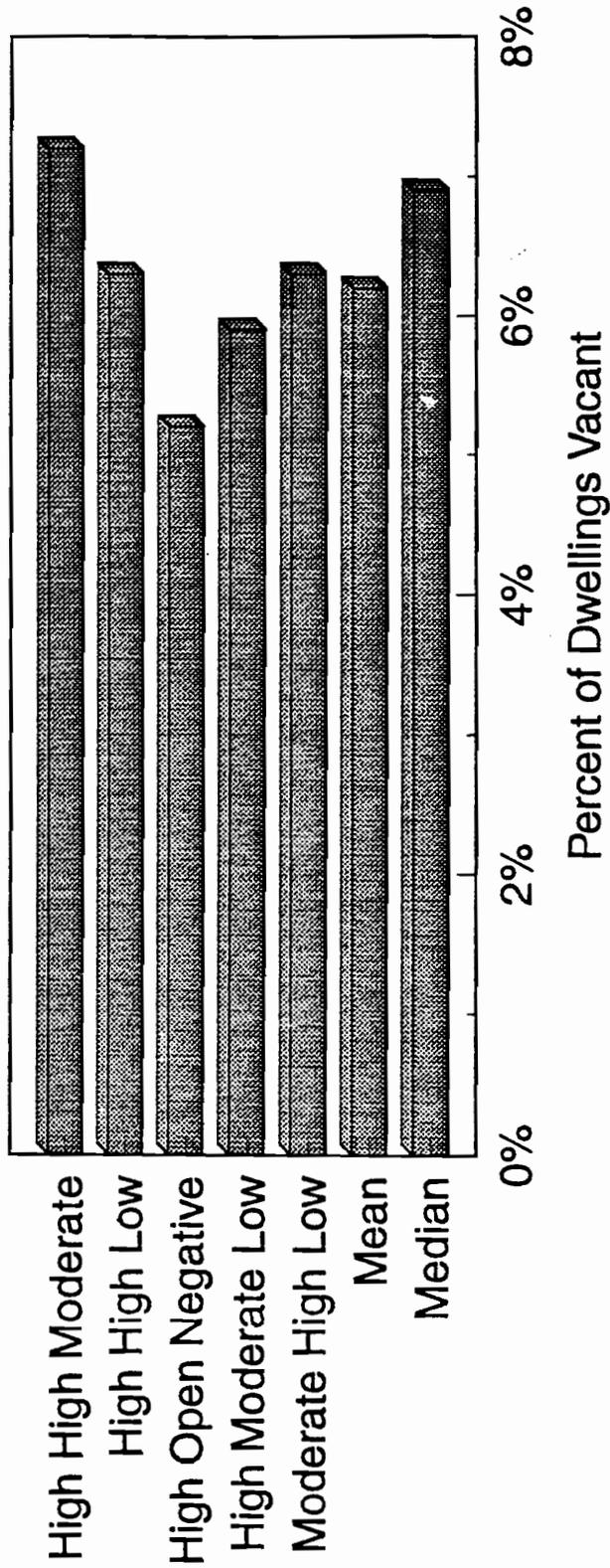
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Figure 2.2.8
Percent of Earnings from Agriculture, Mining
and Construction, by Growth Scenario



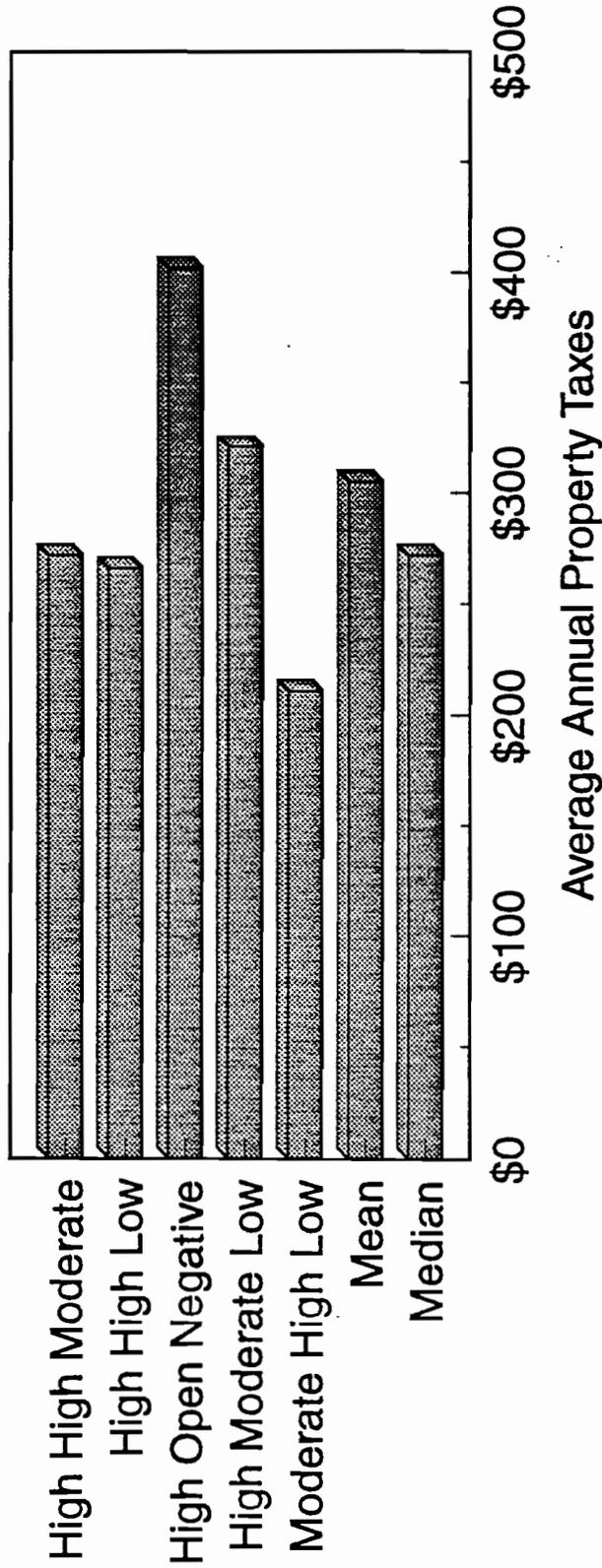
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Figure 2.2.9
Vacancy Rate
by Growth Scenario, 1960-1984



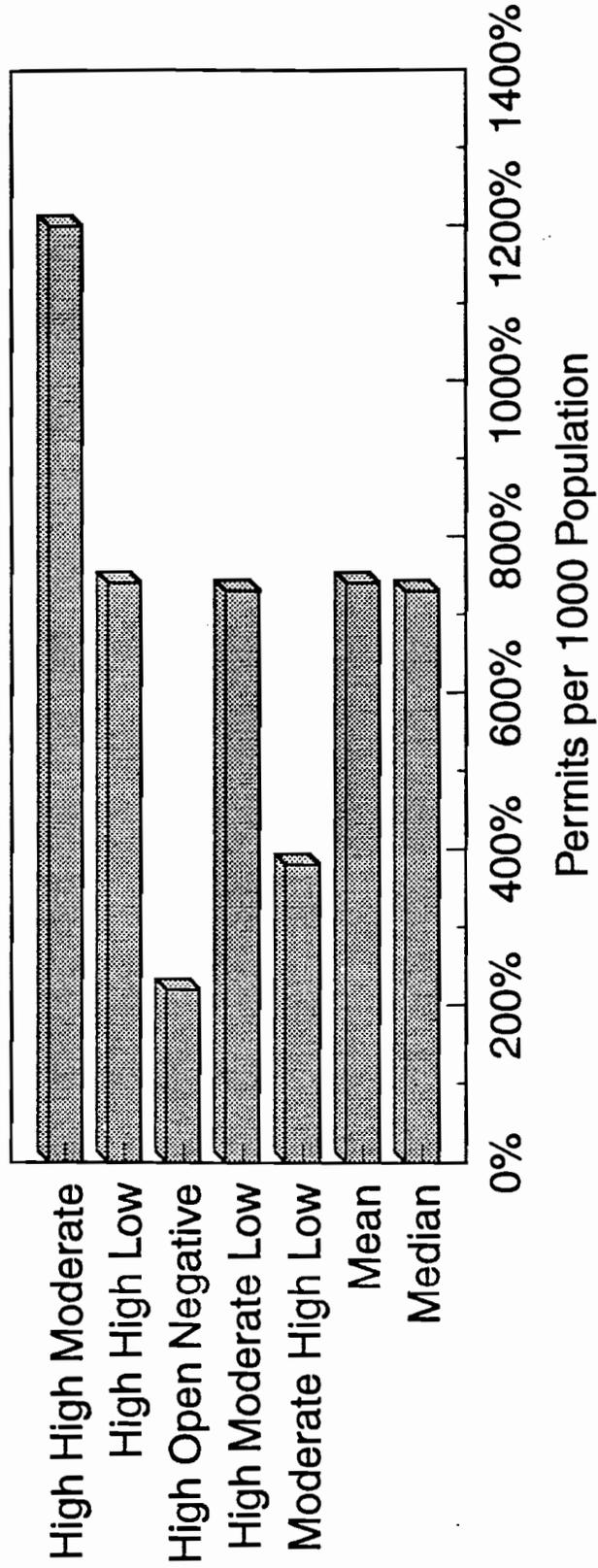
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Figure 2.2.10
Per Capita Local Property Taxes
by Growth Scenario, 1960-1984



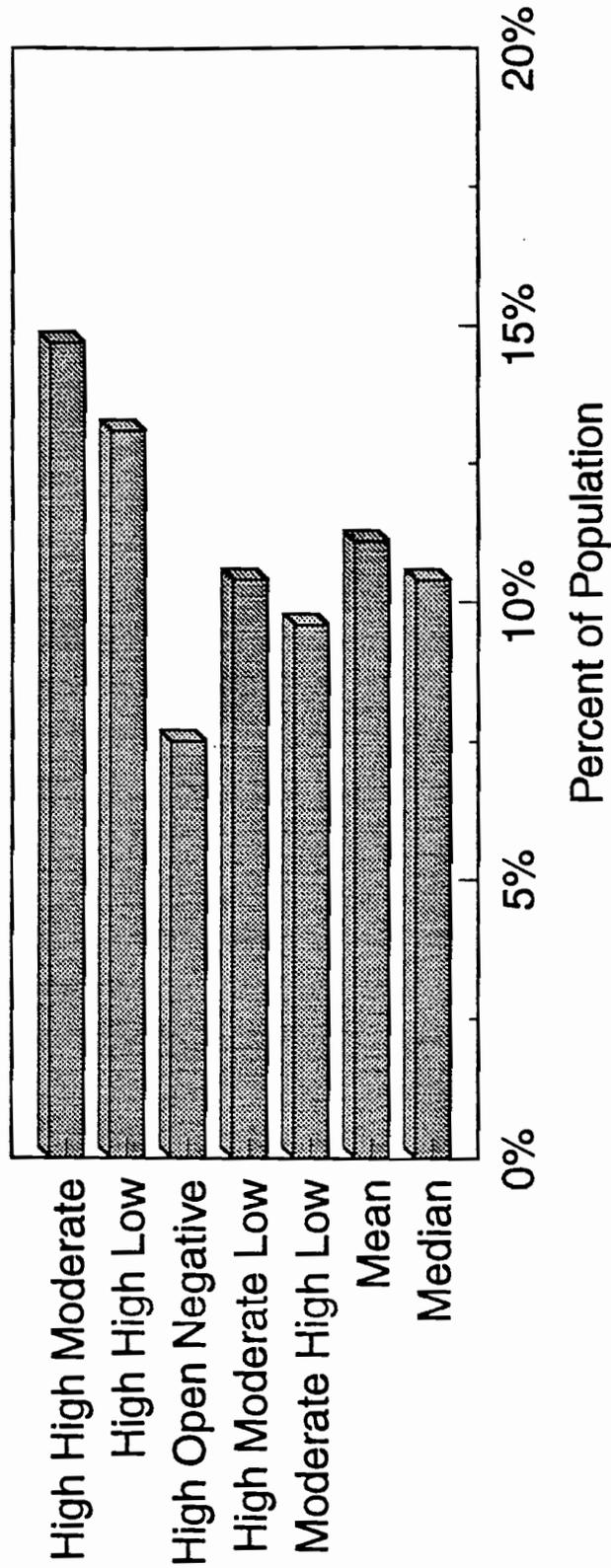
Source:
 Table 2.2

Figure 2.2.11
Building Permits per 1000 Population
by Growth Scenario, 1960-1984



Source:
 Table 2.2

Figure 2.2.12
Migration from within State
by Growth Scenario, 1960-1984



Source:
 Table 2.2

Part III

Analysis of the Las Vegas Economy over Time

Introduction

In this part of our analysis we look at the performance of sectors of the Las Vegas economy over the period 1970 through 1989. In particular, we have identified those sectors of the Las Vegas economy which, in the past and especially in the 1979 through 1983 national recessions, exhibited above-average sensitivity to reductions in growth.

Overview of Sectors of the Las Vegas Economy:

1970 - 1989

Table 3.1 shows the values of key economic variables in the Las Vegas economy for the 1970 to 1989 period.¹ The table also contains the annual percent change in many variables listed. Figures 3.1.1 through 3.1.6 plot the values of six key economic variables along with population to show how these variables compare with population growth over time. Figures 3.1.7 through 3.1.13 portray rates of change in the key economic variables along with the rate of change in population.

Points of interest in Figures 3.1.1 through 3.1.6 are, first, that total employment and all the other key variables except construction were virtually unaffected by the 1972 - 1974 recession but were seriously affected by the recession of 1979 - 1983. Second, all the employment swings were clearly greater

¹ In order to obtain a consistent time series, we used data supplied by the U.S. Bureau of Economic Analysis. For this reason, some of the 1989 statistics in Table 3.1 differ from statistics reported elsewhere.

than the change in population. Third, construction employment changes reflect both recessions. In the early 1970's, construction employment peaked in 1973, fell steadily through 1975, and did not return to its pre-recession level until 1977. Construction hit its second peak in 1979, declined in 1980, increased slightly in 1981, then fell in 1982 and 1983, and did not return to its 1979 level until 1985.

Figures 3.1.7 through 3.1.13 focus on the second point above: that swings in total employment and in each of the other series were generally greater over time and of longer duration than swings in population. In Figure 3.1.11 changes in state and local government employment appear to lead population changes by about one year. Among other employment categories, there is no definite pattern between employment and population changes. The most important conclusion from these time series is that population is the most sluggish variable in the group. This implies that small percent changes in population are accompanied by larger shifts in total employment and its components.

Table 3.2 reports the variability of growth rates for the economic indicators shown in Table 3.1. To measure the volatility of these economic indicators, we computed the coefficient of variation for each series. The coefficient of variation is the ratio of the standard deviation to the mean, and can be used to compare the degree of variability across different variables. Not surprisingly, changes in the unemployment rate were the most volatile, since the mean change was close to zero, and the standard deviation was relatively large. Among the employment categories, the rate of change in construction employment was the most volatile, even with a large mean. The other two categories with coefficients of variation greater than one are manufacturing and federal civilian employment. The volatility of these two series can be attributed to their small means.

Table 3.2 also reports the difference in the rate of growth during the 1979-1983 recession, measured from the peak in 1979 to the trough in 1983. We generated the percentages in the table by subtracting the growth rate in 1983 from the 1979 growth rate. By this measure, the category of finance, insurance, and real estate was the most severely affected, followed by construction, the hospitality industry,² and retail trade. Indeed, since the latter two industries form the bulk of Clark County and Nevada tax revenue (gaming, entertainment, and sales taxes), we can predict that precipitous changes in employment growth will severely affect state and local government tax collections.

There are causes other than the drop in the rate of population growth involved in the reduction in employment growth shown in Table 3.2. For example, high interest rates contributed to the decline of construction activity and declining real income spurred the reduction in retail trade. Nevertheless, there is a sound basis for expecting that a reduction in population growth from any cause will, by itself, have a serious negative effect on employment sectors found sensitive to the business cycle. Further, as noted in the introduction, construction is both a result from and a cause of growth in population. New construction workers often migrate to the community, which spurs the construction of housing and commercial buildings. Also there are construction activities, such as building senior-citizen housing complexes, which specifically attract new immigrants.

Conclusions

The analysis in Part III has documented the volatility of Las Vegas employment patterns over the business cycle. While the 1972-1974 recession was relatively benign except for construction, the 1979-1983 recession produced sharp

² We compute hospitality employment as the sum of employment in hotel and lodging, eating and drinking establishments, and amusement and recreation.

declines in the rates of change in retail trade, finance, insurance, and real estate, government, and construction employment. Were Las Vegas to experience a sharp downturn from water-shortage impediments to employment growth, severe disruptions would again be experienced.

Table 3.1
Economic Indicators for the Clark County Economy
 (Based on Bureau of Economic Analysis Data)

Year	Population (1000s)	Personal Income (billions current \$)	Per Capita Income (current \$)	Total Employment (1000s)	Unem- ployment Rate	Construction Employment (1000s)	Service Employment (1000s)
1970	276.1	\$0.985	\$3,568	131.9	5.8%	8.2	54.9
1971	293.0	\$1.144	\$3,904	136.3	7.4%	8.3	56.2
1972	307.4	\$1.267	\$4,122	143.4	7.7%	8.7	59.7
1973	319.4	\$1.389	\$4,349	157.8	6.7%	11.7	66.1
1974	336.5	\$1.786	\$5,308	166.0	8.1%	9.9	72.5
1975	351.3	\$2.059	\$5,861	171.1	10.6%	8.1	76.0
1976	369.5	\$2.318	\$6,273	183.0	9.7%	9.3	80.2
1977	390.0	\$2.680	\$6,872	201.2	8.1%	11.8	87.8
1978	412.9	\$3.221	\$7,801	224.8	5.0%	15.7	97.1
1979	441.4	\$3.751	\$8,498	248.0	5.7%	17.7	108.2
1980	469.0	\$4.357	\$9,290	261.1	7.0%	16.2	116.1
1981	491.7	\$4.973	\$10,114	269.6	8.2%	16.9	118.5
1982	510.4	\$5.274	\$10,333	266.5	9.4%	14.6	119.3
1983	526.5	\$5.740	\$10,902	271.8	10.3%	14.6	122.1
1984	540.7	\$6.101	\$11,284	286.1	8.5%	16.3	129.1
1985	550.7	\$6.635	\$12,048	301.3	8.6%	17.3	136.7
1986	570.0	\$7.206	\$12,642	318.2	6.3%	20.2	144.8
1987	599.1	\$8.021	\$13,388	343.5	6.5%	21.8	157.7
1988	631.3	\$9.117	\$14,442	368.7	5.4%	26.2	169.8
1989	668.8	\$10.467	\$15,650	405.1	5.2%	35.1	182.3

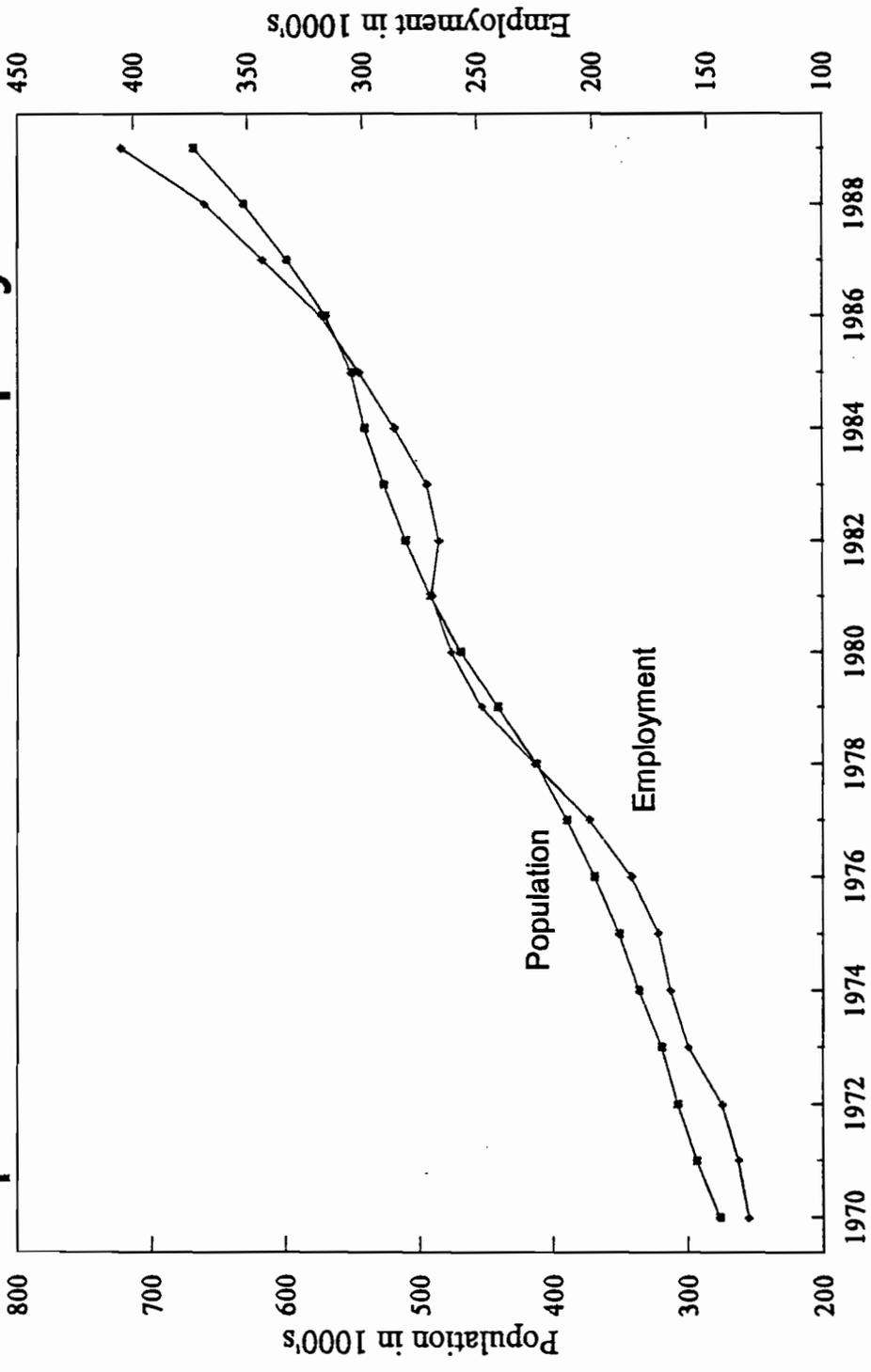
Year	Wholesale Trade Employment (1000s)	Federal Government Civilian Employment (1000s)	Finance Insurance Real Estate Employment (1000s)	Hospitality Employment (1000s)	State and Local Government Employment (1000s)	Manufac- turing Employment (1000s)	Retail Trade Employment (1000s)
1970	3.0	4.2	6.4	41.8	12.6	4.4	20.4
1971	3.2	4.2	7.1	42.1	13.9	4.2	21.1
1972	3.4	4.1	8.1	43.9	14.7	4.4	22.5
1973	3.7	4.2	8.7	48.5	15.3	5.2	24.6
1974	3.9	4.5	9.1	53.7	16.0	5.3	25.9
1975	4.1	4.6	9.1	56.6	17.1	5.3	27.2
1976	4.3	4.6	10.0	59.5	17.9	5.5	30.1
1977	4.6	4.5	11.6	65.9	19.3	6.0	33.3
1978	5.6	4.6	13.5	73.5	20.6	6.7	37.5
1979	6.3	4.9	16.2	83.1	21.7	7.3	41.5
1980	6.5	4.9	17.4	87.6	22.4	7.3	44.1
1981	6.8	5.0	17.6	88.7	23.0	7.7	46.5
1982	6.7	5.0	18.0	87.7	23.6	7.1	43.9
1983	6.9	5.2	18.6	89.1	23.4	7.7	44.0
1984	7.8	5.5	20.5	93.0	23.8	8.0	46.1
1985	8.7	5.9	22.2	98.5	24.4	8.4	48.7
1986	9.3	6.2	23.0	102.8	25.5	8.7	50.8
1987	10.4	6.4	24.5	112.3	26.7	9.3	55.5
1988	11.3	6.3	26.1	119.8	28.2	10.0	59.3
1989	12.5	6.7	28.1	127.2	30.1	10.5	64.8

Table 3.1 (Continued)
Economic Indicators for the Clark County Economy
 (Based on Bureau of Economic Analysis Data)

Year	Percent Change in Population	Percent Change in Personal Income	Percent Change in Per Capita Income	Percent Change in Total Employment	Percent Change in Unemployment Rate	Percent Change in Construction Employment	Percent Change in Service Employment
1971	6.1%	16.1%	9.4%	3.4%	27.6%	1.1%	2.32%
1972	4.9%	10.8%	5.6%	5.2%	4.1%	4.7%	6.37%
1973	3.9%	9.6%	5.5%	10.1%	-13.0%	34.9%	10.58%
1974	5.4%	28.6%	22.0%	5.2%	20.9%	-15.6%	9.76%
1975	4.4%	15.3%	10.4%	3.1%	30.9%	-18.3%	4.86%
1976	5.2%	12.6%	7.0%	7.0%	-8.5%	15.3%	5.47%
1977	5.5%	15.6%	9.5%	9.9%	-16.5%	27.0%	9.42%
1978	5.9%	20.2%	13.5%	11.8%	-38.3%	32.8%	10.63%
1979	6.9%	16.5%	8.9%	10.3%	14.0%	12.7%	11.40%
1980	6.3%	16.2%	9.3%	5.3%	22.8%	-8.4%	7.32%
1981	4.8%	14.1%	8.9%	3.2%	17.1%	4.1%	2.09%
1982	3.8%	6.1%	2.2%	-1.2%	14.6%	-13.7%	0.67%
1983	3.2%	8.8%	5.5%	2.0%	9.6%	0.1%	2.35%
1984	2.7%	6.3%	3.5%	5.3%	-17.5%	11.7%	5.73%
1985	1.8%	8.8%	6.8%	5.3%	1.2%	6.2%	5.89%
1986	3.5%	8.6%	4.9%	5.6%	-26.7%	16.2%	5.92%
1987	5.1%	11.3%	5.9%	7.9%	3.2%	8.4%	8.93%
1988	5.4%	13.7%	7.9%	7.3%	-16.9%	19.8%	7.66%
1989	5.9%	14.8%	8.4%	9.9%	-3.7%	34.3%	7.37%

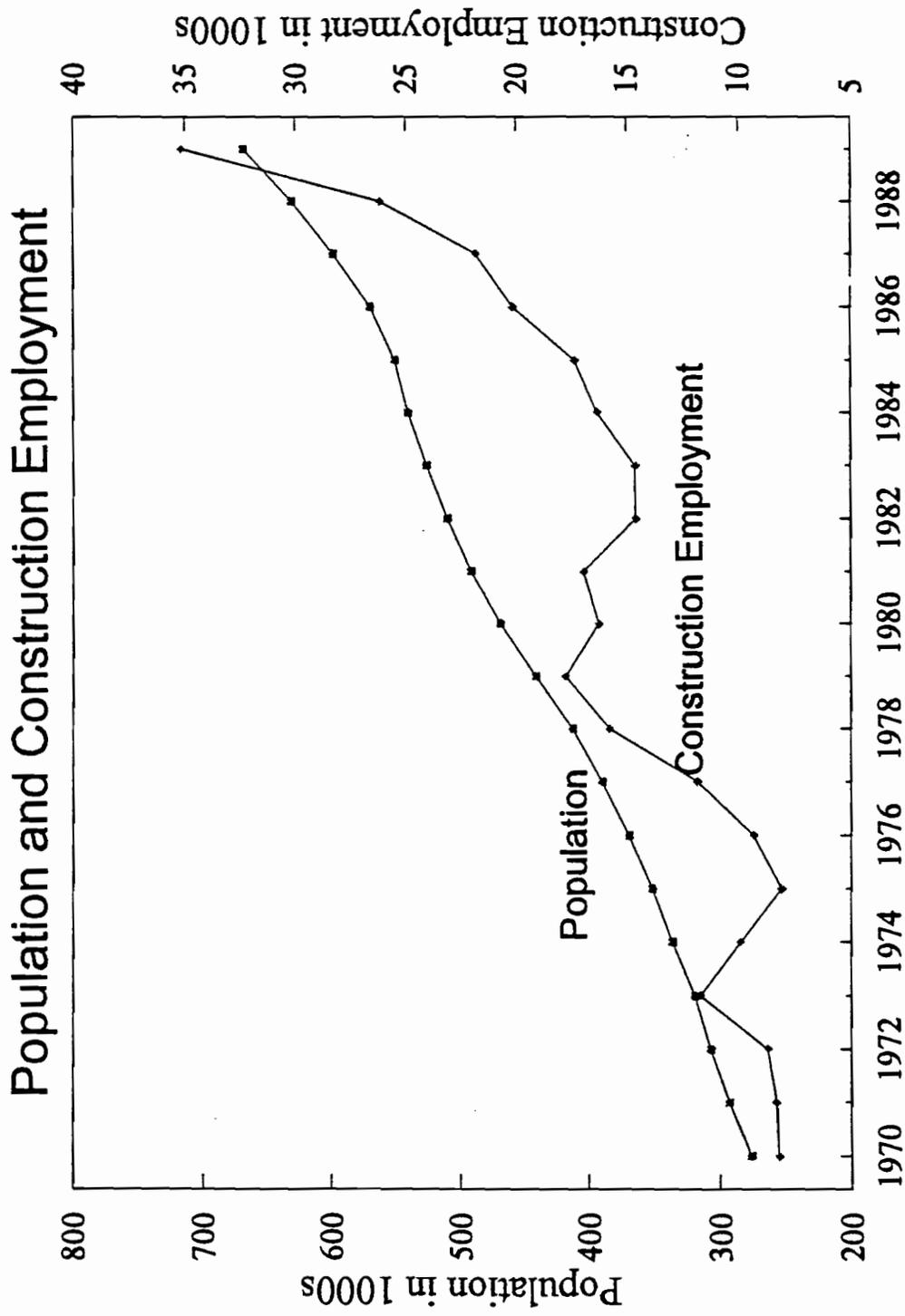
Year	Percent Change Wholesale Trade Employment	Percent Change Federal Civilian Employment	Percent Change Finance Insurance Real Estate Employment	Percent Change Hospitality Employment	Percent Change State and Local Government Employment	Percent Change Manufacturing Employment	Percent Change Retail Trade Employment
1971	4.21%	1.53%	10.83%	0.54%	10.59%	-5.16%	3.36%
1972	6.12%	-2.62%	14.41%	4.42%	5.17%	4.67%	6.60%
1973	9.75%	1.48%	7.32%	10.47%	4.34%	17.93%	9.49%
1974	4.90%	7.75%	4.91%	10.63%	4.72%	1.74%	5.29%
1975	4.86%	2.50%	0.13%	5.51%	6.51%	-0.32%	4.97%
1976	7.04%	-1.58%	9.52%	5.03%	4.77%	3.89%	10.62%
1977	6.76%	-0.44%	15.51%	10.79%	7.71%	9.26%	10.75%
1978	21.62%	1.15%	17.10%	11.58%	7.19%	11.86%	12.70%
1979	11.98%	7.63%	19.47%	13.08%	5.11%	8.99%	10.58%
1980	3.43%	-0.83%	7.42%	5.36%	3.36%	-0.18%	6.17%
1981	3.52%	3.06%	1.38%	1.29%	2.77%	6.73%	5.47%
1982	-1.37%	-1.21%	2.19%	-1.15%	2.56%	-8.57%	-5.58%
1983	3.37%	5.19%	3.67%	1.63%	-0.85%	9.00%	0.19%
1984	12.95%	4.92%	9.70%	4.30%	1.54%	3.88%	4.94%
1985	11.03%	7.12%	8.68%	5.96%	2.49%	4.68%	5.55%
1986	7.53%	5.02%	3.53%	4.38%	4.69%	3.58%	4.37%
1987	12.31%	3.70%	6.65%	9.22%	4.77%	6.85%	9.10%
1988	8.01%	-1.87%	6.54%	6.68%	5.37%	7.23%	6.95%
1989	11.18%	5.90%	7.58%	6.16%	6.73%	5.87%	9.24%

Figure 3.1.1
Population and Total Employment



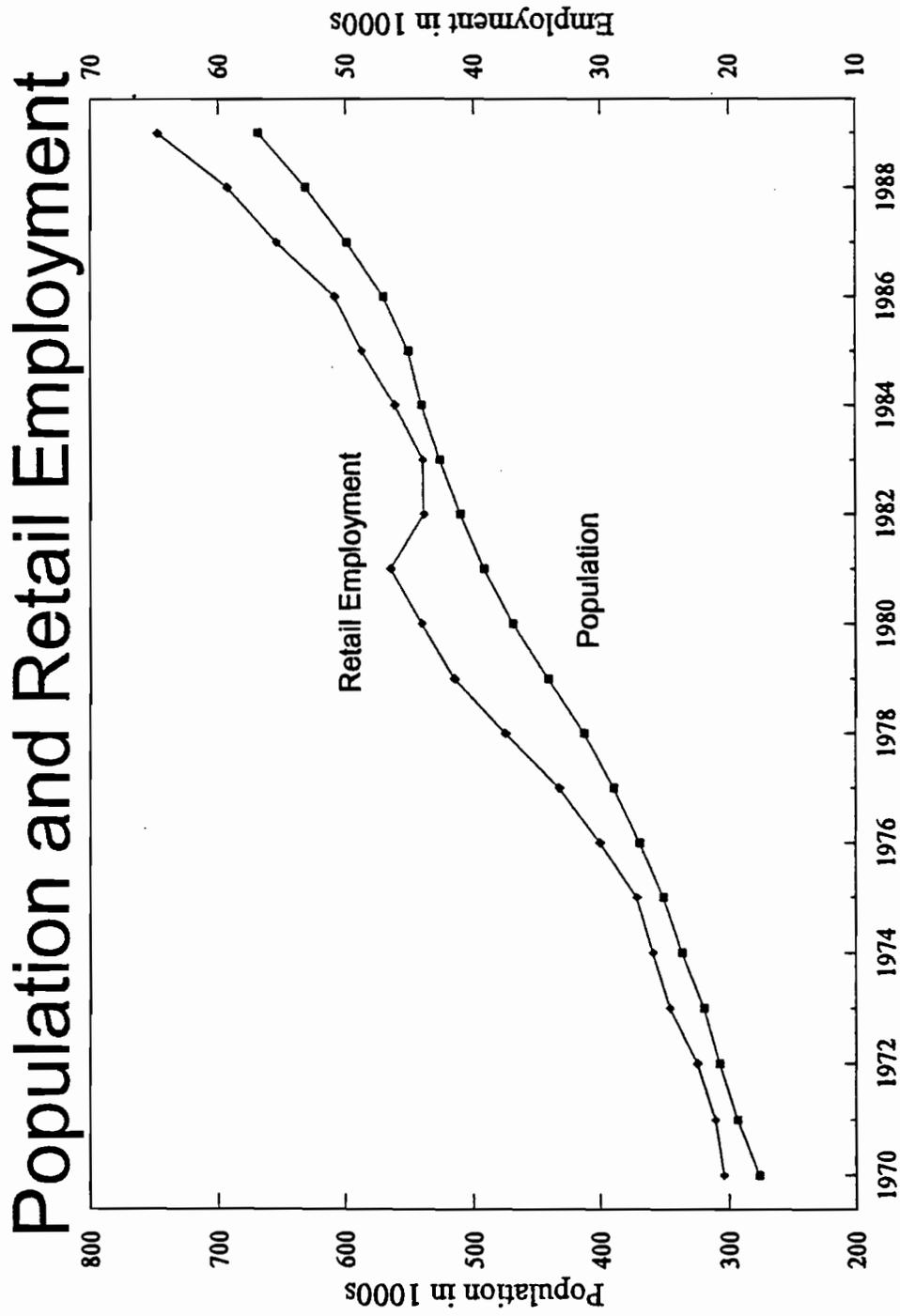
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Figure 3.1.2



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Figure 3.1.3



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Figure 3.1.4

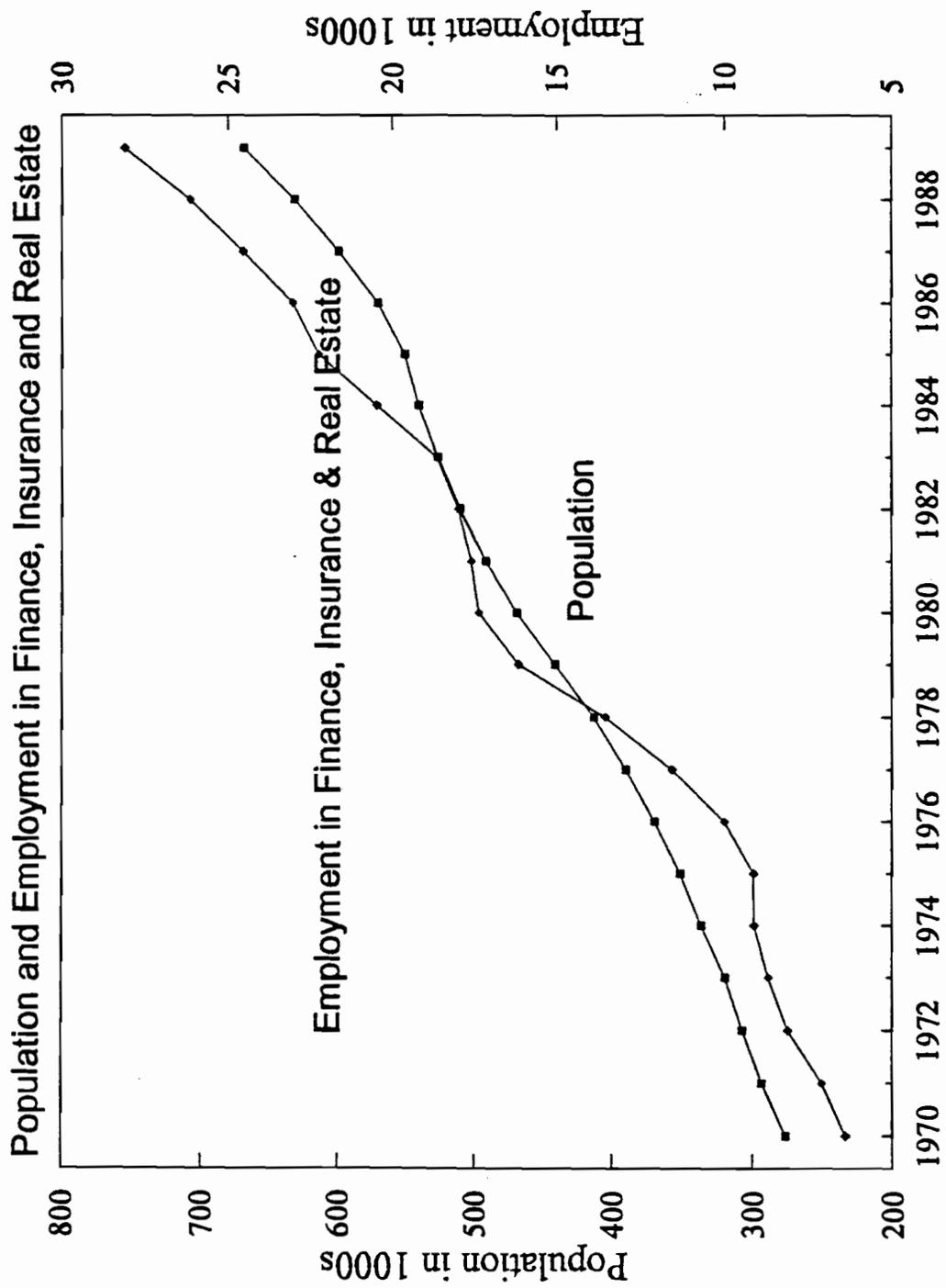
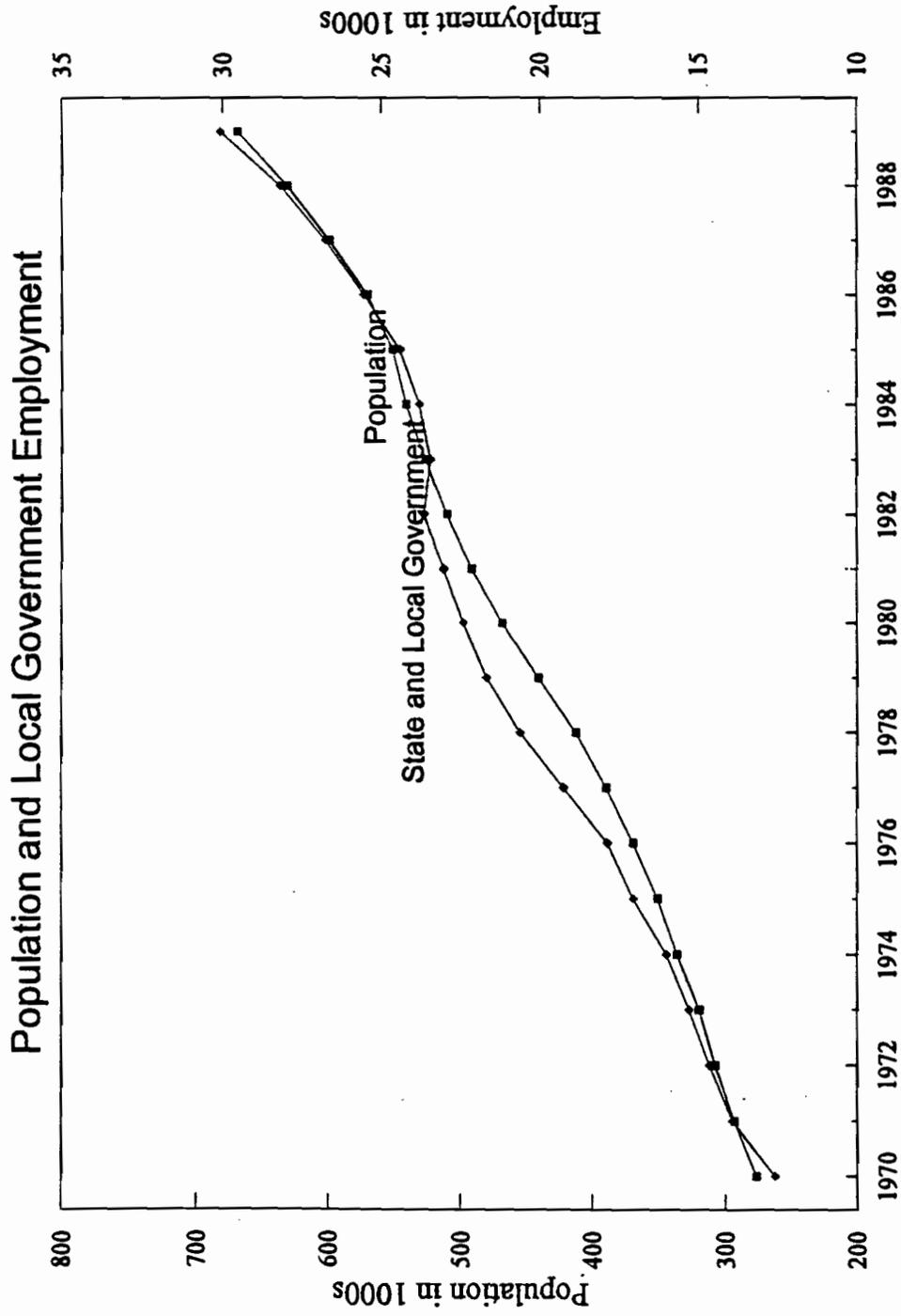
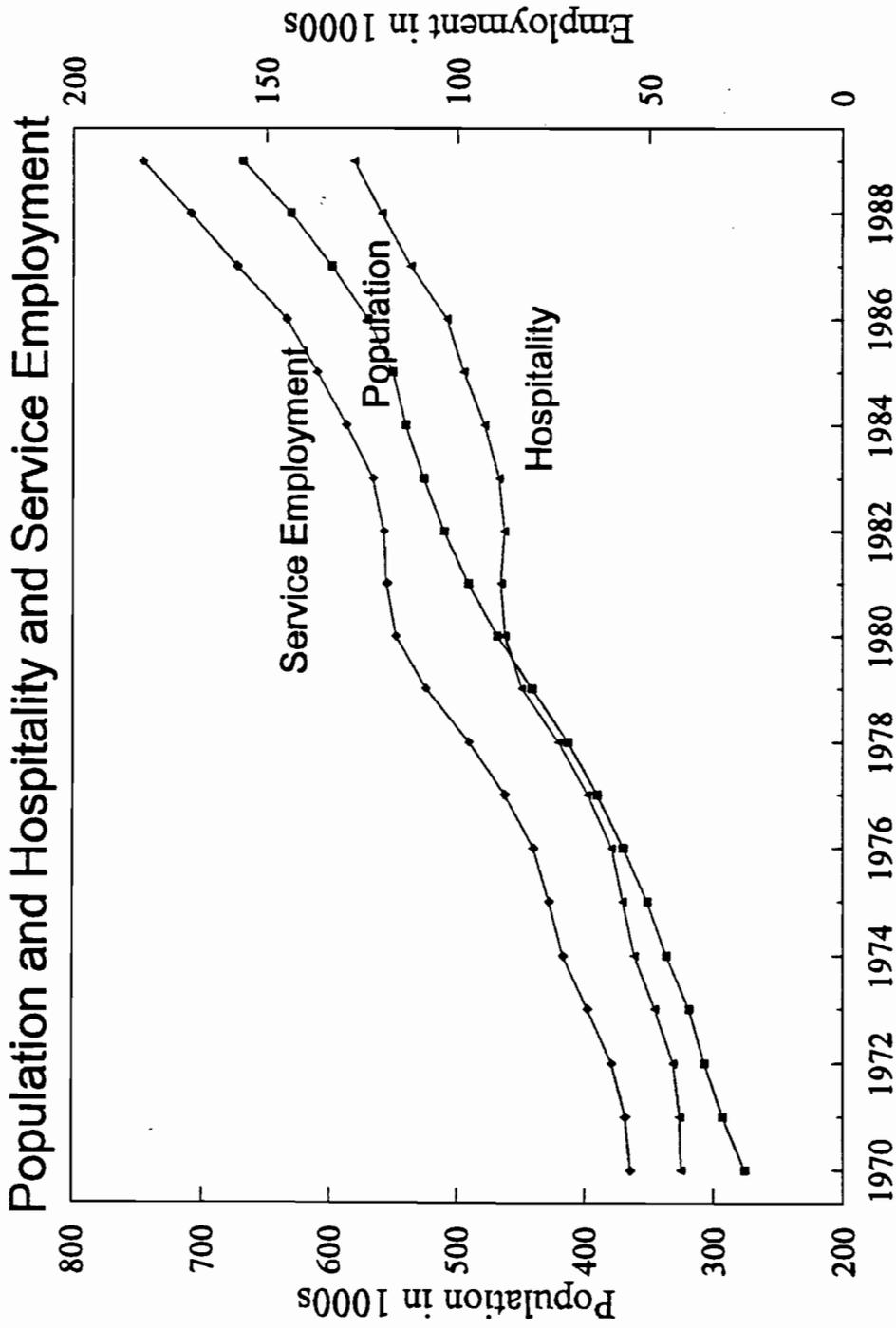


Figure 3.1.5



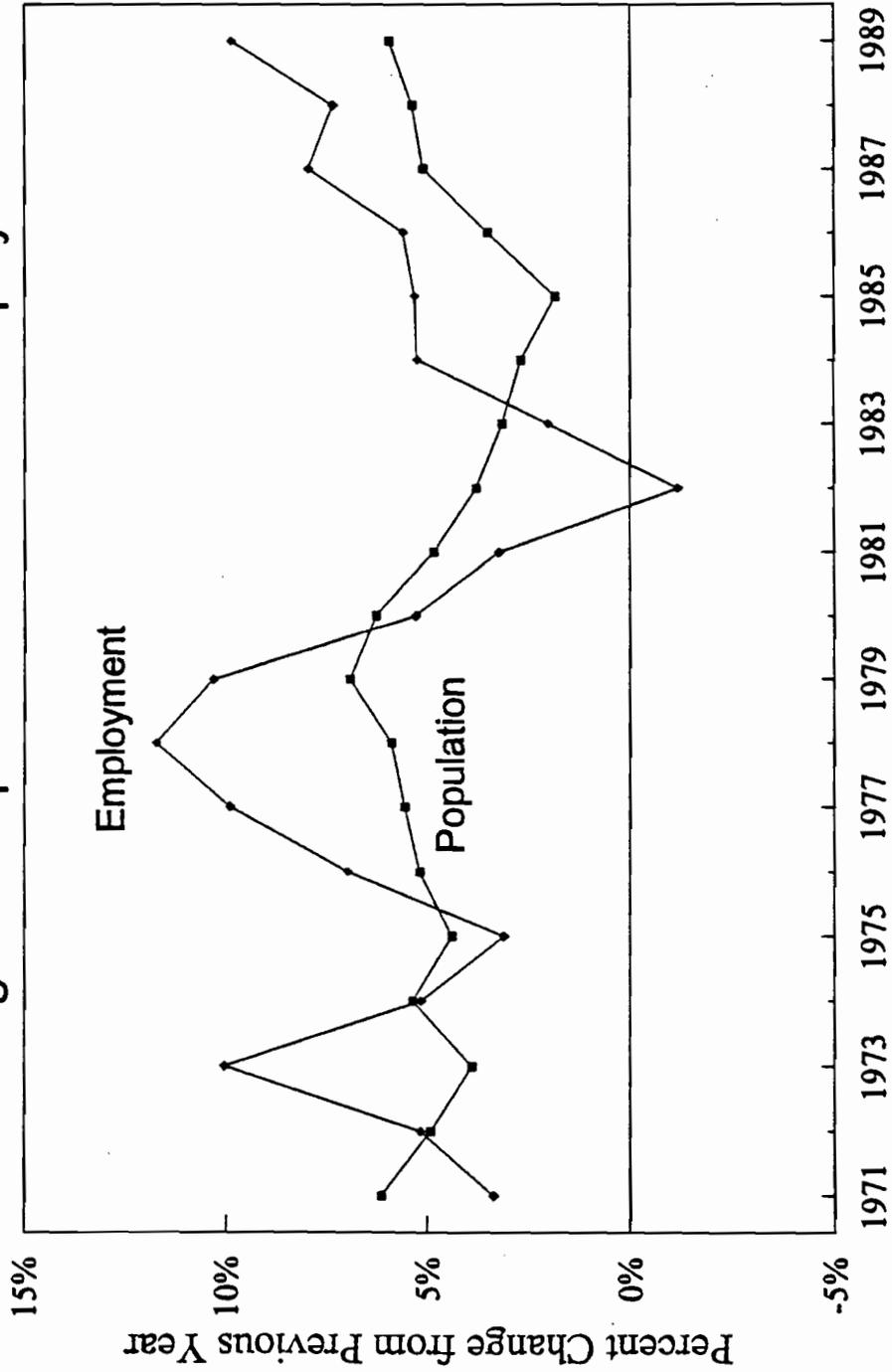
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Figure 3.1.6



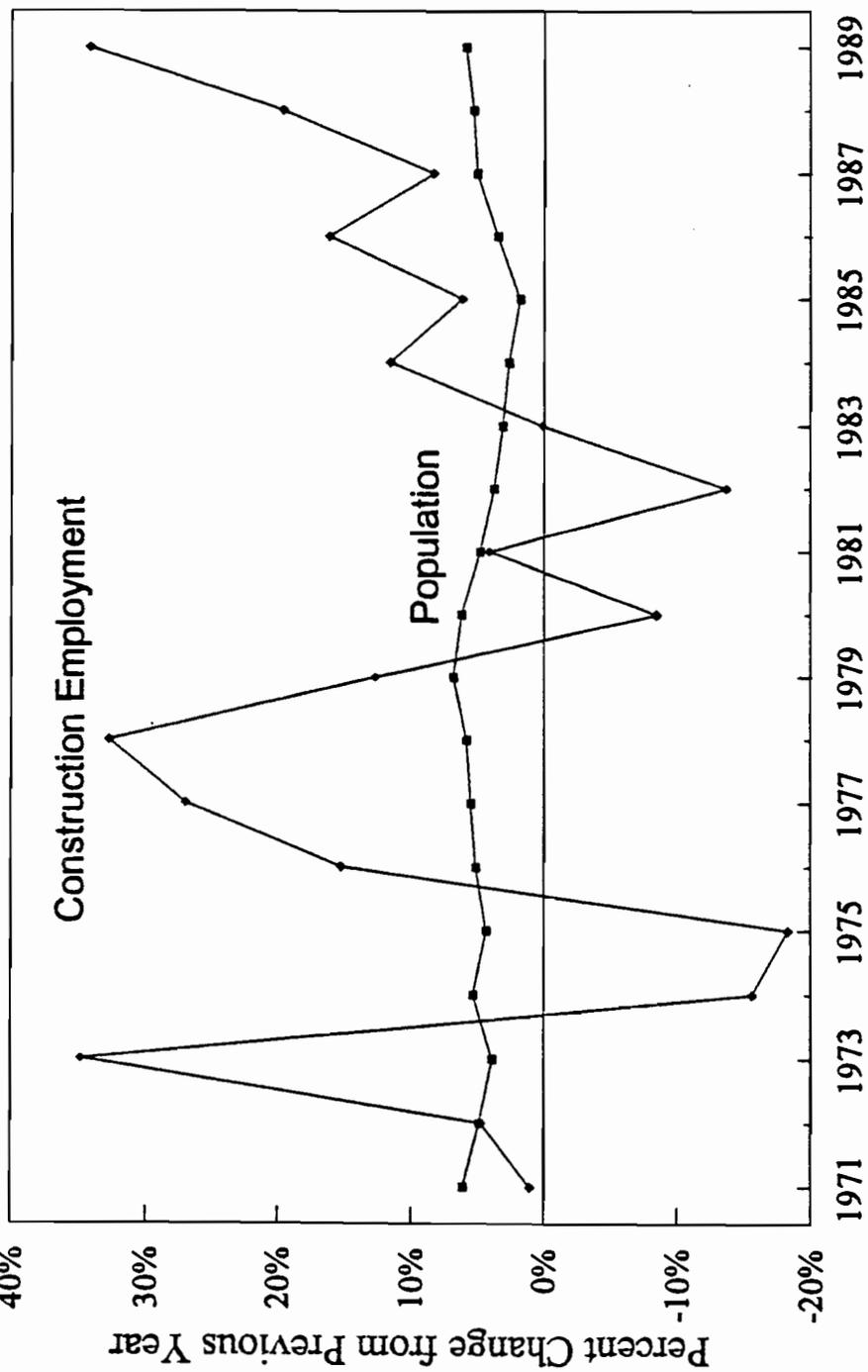
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Figure 3.1.7
Changes in Population and Total Employment



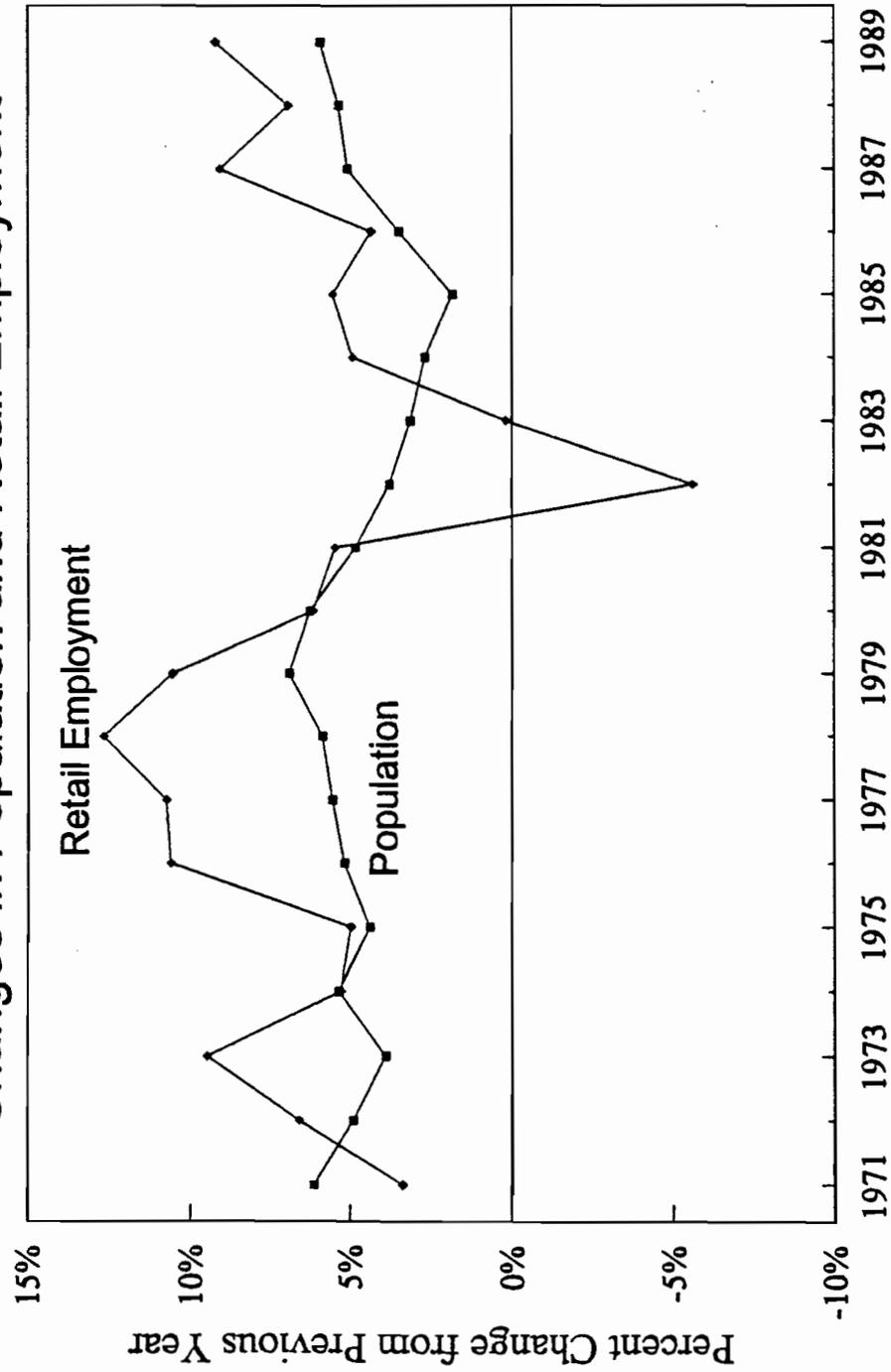
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Figure 3.1.8
 Changes in Population and Construction Employment



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 Table 3.1

Figure 3.1.9
Changes in Population and Retail Employment



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Table 3.1

Figure 3.1.10

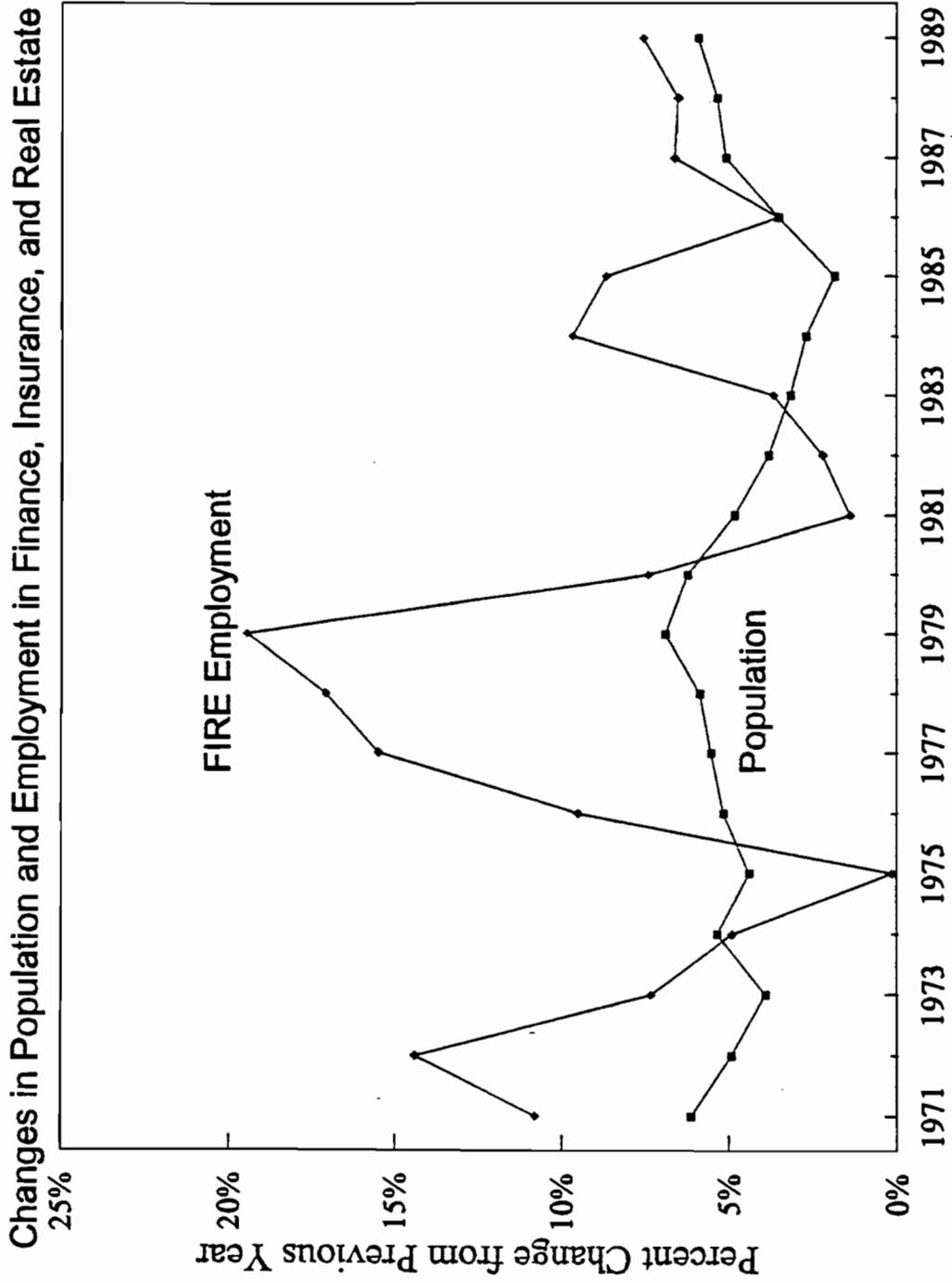
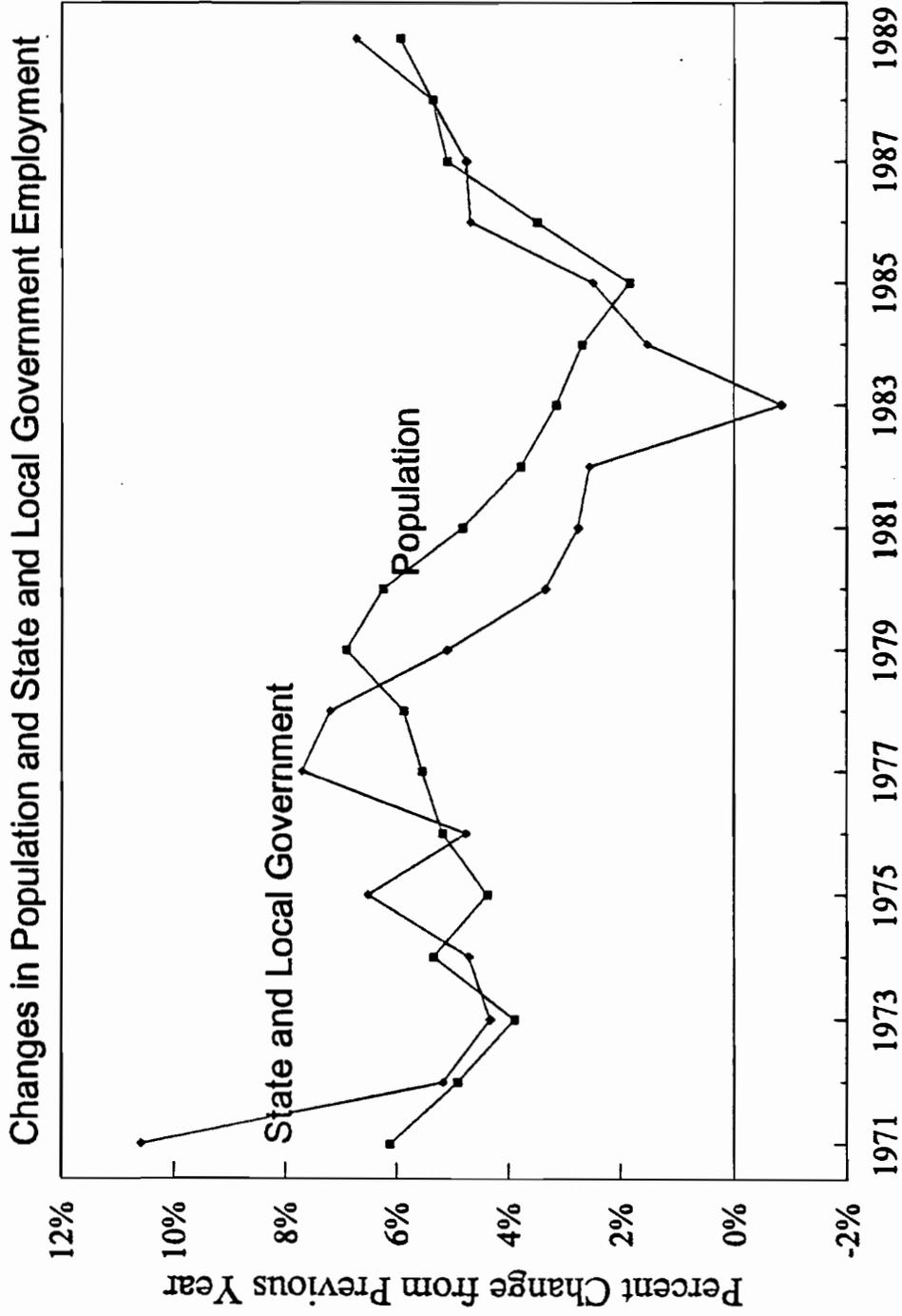
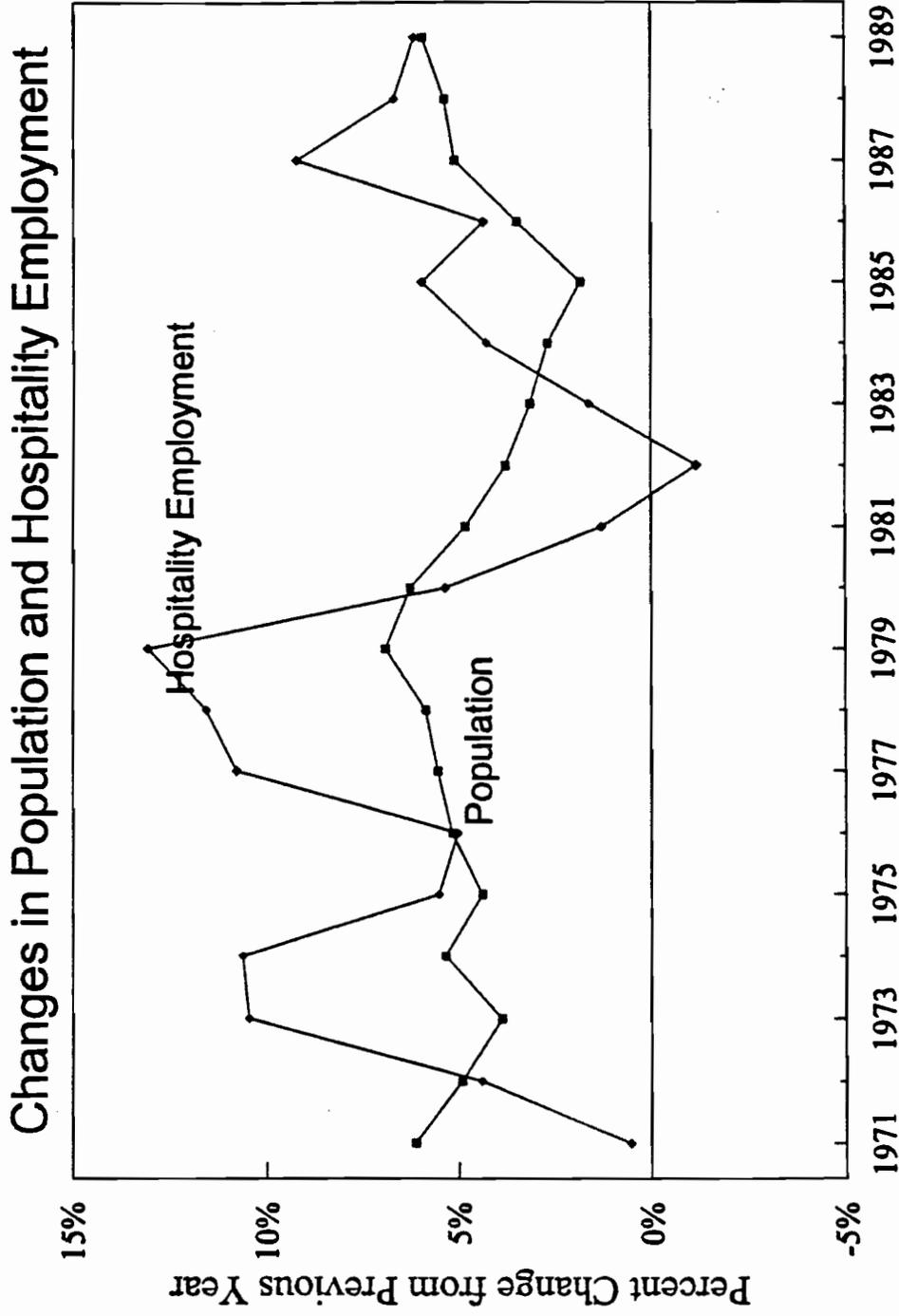


Figure 3.1.11



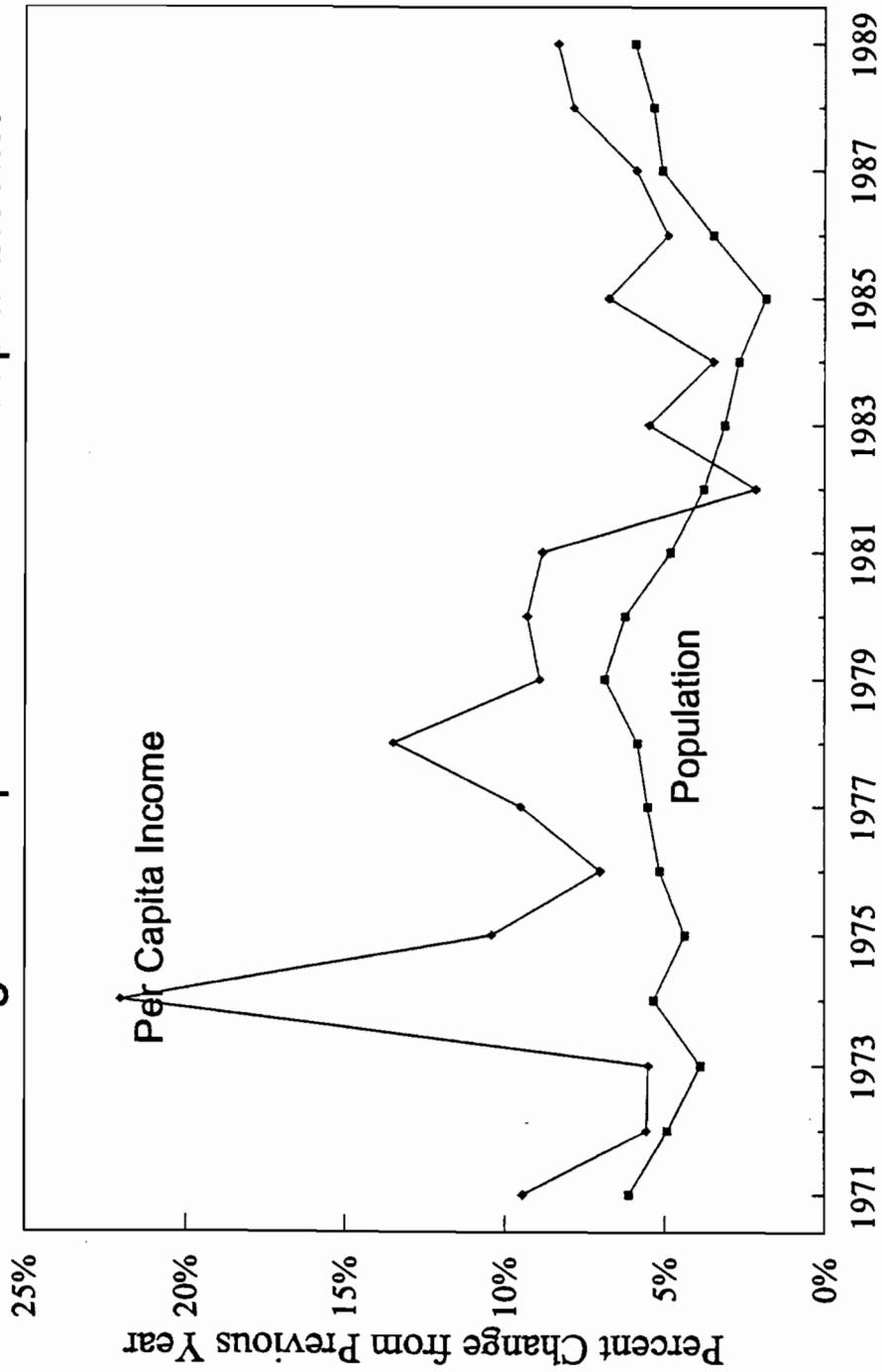
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Figure 3.1.12



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Table 3.1

Figure 3.1.13
Changes in Population and Per Capita Income



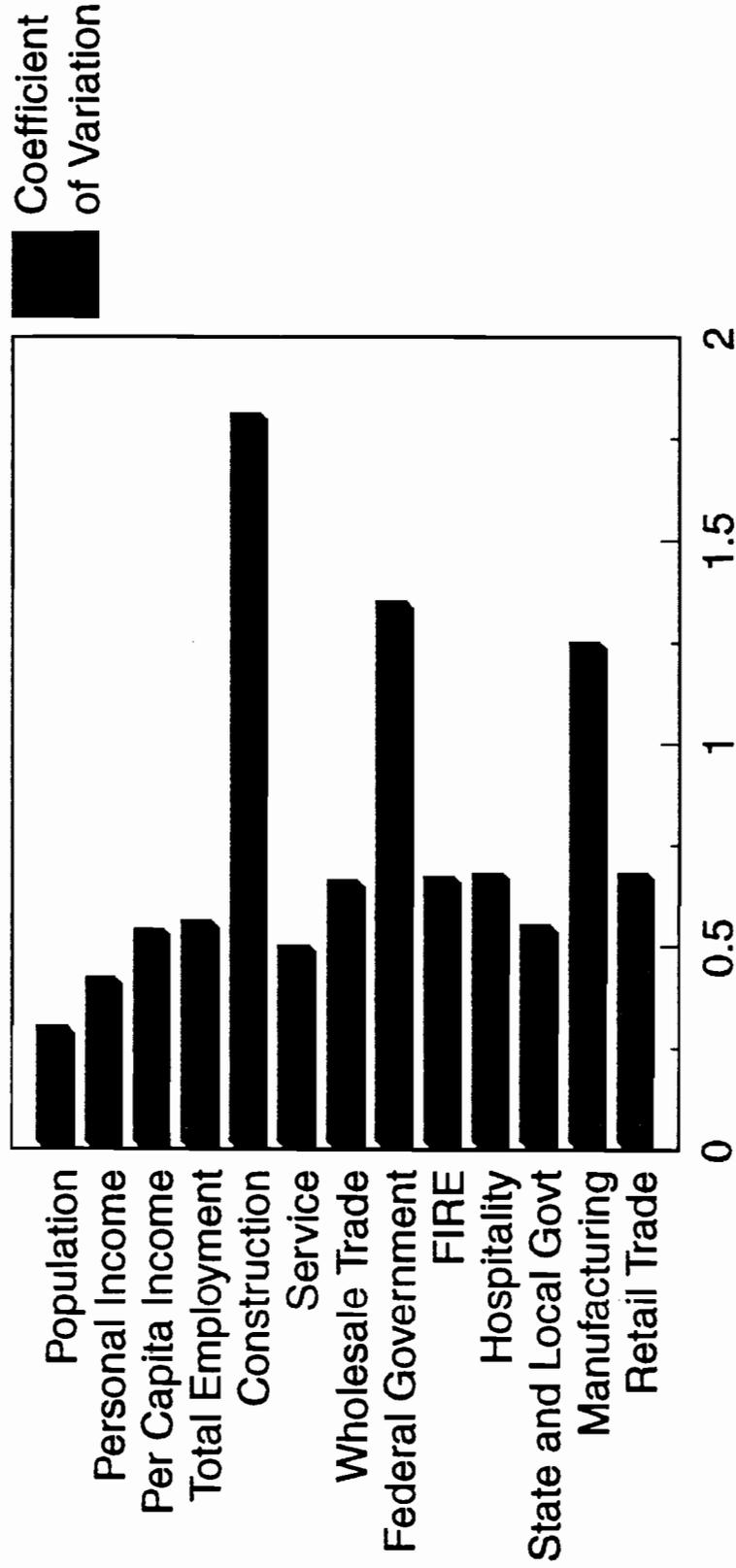
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Table 3.1

Table 3.2
Comparison of Growth Rates for Clark County Economic Indicators
(Based on Bureau of Economic Analysis Data)

	Population	Personal Income	Per Capita Income	Total Employment	Unem- ployment Rate	Construction Employment	Service Employment
Mean	4.77%	13.36%	8.17%	6.13%	1.31%	9.12%	6.57%
Standard Deviation	1.33%	5.31%	4.28%	3.31%	19.38%	16.30%	3.15%
Coefficient Of Variation	0.28	0.40	0.52	0.54	14.84	1.79	0.48
Peak-Trougt Range	3.75%	7.62%	3.43%	8.29%	4.43%	12.60%	9.05%

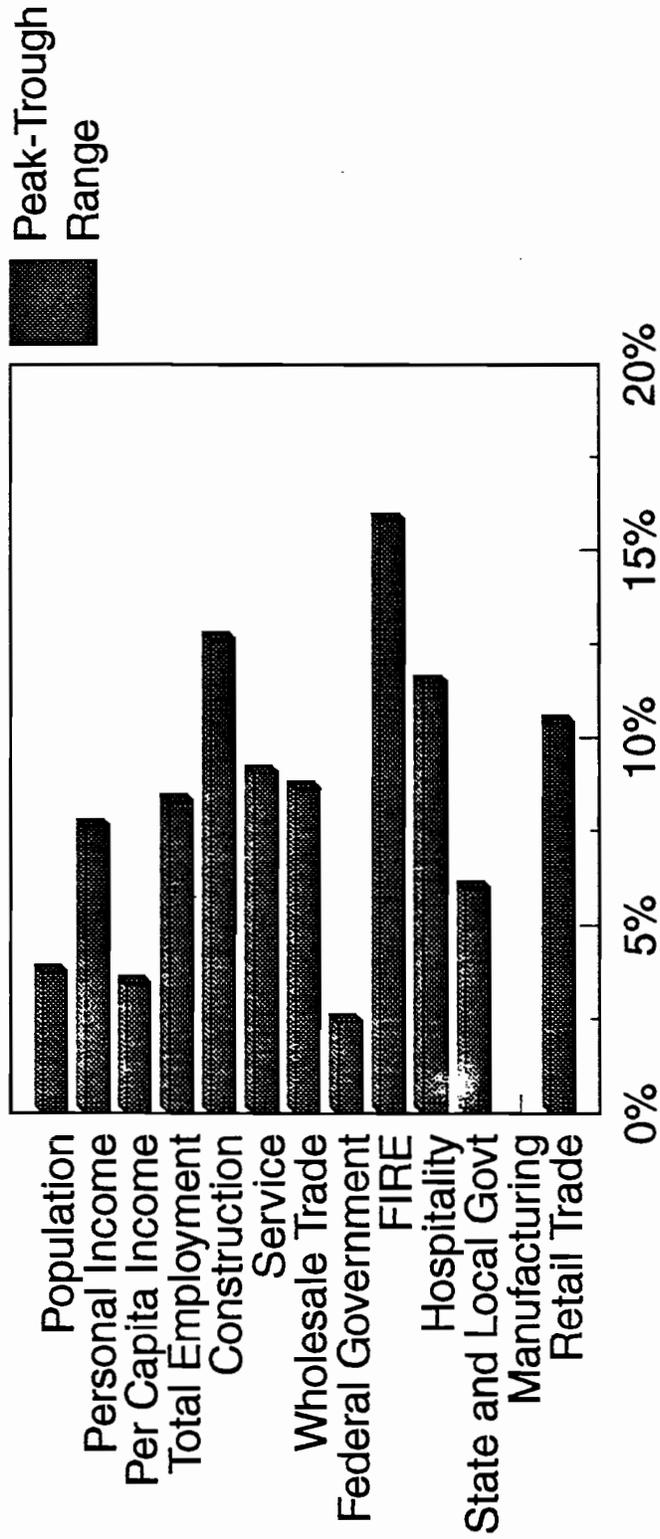
	Wholesale Trade Employment	Federal Civilian Employment	Finance Insurance Real Estate Employment	Hospitality Employment	State and Local Government Employment	Manufac- turing Employment	Retail Trade Employment
Mean	7.85%	2.55%	8.24%	6.10%	4.71%	4.84%	6.36%
Standard Deviation	5.04%	3.39%	5.36%	4.00%	2.52%	5.93%	4.23%
Coefficient Of Variation	0.64	1.33	0.65	0.66	0.54	1.23	0.67
Peak-Trougt Range	8.61%	2.43%	15.80%	11.46%	5.97%	-0.02%	10.39%

Figure 3.2.1
Volatility of Clark County Economic Indicators



Source: Tables 3.1 and 3.2

Figure 3.2.2
Variation in Economic Indicators
During 1979-1983 Recession



Source: Table 3.1 and Table 3.2

Part IV
The Impact of An Unanticipated Water Shortage
on the Economy

Introduction

Part I of this report presented the likely future of the Las Vegas region, assuming adequate water supplies allow growth to natural maturation. In Part II we contrasted the growth experiences of a cross-sectional sample of over 300 metropolitan areas. We documented that a process of natural maturation is generally most conducive to economic health. A gradual growth, pacing the national average, leads to healthy income, employment, and quality-of-life conditions. An abrupt cessation of rapid growth is likely to throw the economy into declines in employment and population, causing unemployment, declining income, and deteriorating ambience. Part III showed the volatility of key Las Vegas industries--particularly retail trade, construction, and finance--over the business cycle. These industries would most feel the sting of an economic downturn caused by the exhaustion of current water allocations.

In Part IV, we simulate a cessation of building caused by a water shortage, assumed to occur in the year 2006 when the Las Vegas Valley Water District forecasts full utilization of its water allocation. We assumed that, in 2006 new hotel construction and new residential construction fall to zero, instead of gradually leveling off as assumed in Part I of this study. We also ended the construction of new schools and removed the growth-induced highway improvements. We further posited that immigration of senior citizens would suddenly decline to the national rate (that is, the rate predicted by the REMI model based on national trends). In addition, we assumed that a water-shortage-induced growth impediment would initially destroy one-third of construction jobs. This assumption is consistent with the difference in the proportion of jobs in construction between rapidly growing and declining cities. Other construction jobs would be lost and

employment and population would have declined. Data for the impact of the water-shortage scenario are shown in Table 4.1.

The simulation of the abrupt cessation of construction activity in 2006 provides a best-case scenario of the impact of a water shortage on the Las Vegas area economy. The REMI model presupposes an efficient operation of a competitive economy. A mammoth shock to one sector of the economy would generate countervailing forces elsewhere which, in the future, allay the economic damage. A decline in employment, directly or indirectly attributed to decreased construction, would reduce local wage rates relative to those in other areas. Higher wages elsewhere would encourage displaced workers to emigrate in search of employment; lower wages in the Valley would attract new employers not dependent on water. A ban on new construction would have such extensive and devastating influences in the short run that more efficient water-use patterns would soon be implemented. With increased water conservation (from a combination of higher water prices and a more conservation-conscious public), new construction would be "financed" out of water saving from reduced lawn watering and fewer leaky faucets.

With widespread discouragement in the wake of diminished construction activity and pessimism about future water sources, the adjustment processes discussed above could be less than fully effective and perhaps not effective at all. Community growth would be resumed only after a very long period and then only very slowly. As a worst case possibility, which should at least be recognized, the drop in population shown after 2006 could be of indefinite duration and the population curve shown for the water-shortage case on page 114 would be flat or even decline. Should this occur, projections for other variables, all of which depend to some extent on population growth, will flatten or decline as well.

Even in the best-case scenario, the reactions to the cutbacks in 2006 will include a sharp increase in unemployment. Assuming an unemployment rate of 4.5 percent in 2005, the onset of a water shortage would accelerate the short-run unemployment rate to a Great Depression level of 12.5 percent. Workers will

have no choice but to respond with outmigrations, withdrawals from the labor force, delayed entry into the labor force, and early retirements. While these responses will in the longer term reduce the local unemployment rate, they do so at heavy economic and social costs. These costs include unwanted relocations, unanticipated changes in career plans, distress sales of homes, forced family separations and many other negative, if not catastrophic, forced reactions to the dismal employment prospects in the community.

The Short-Run Impact of a Water Shortage on Clark County

Imagine that in the year 2006 the Las Vegas Valley Water District announced that, due to its inability to secure alternative sources of water, the growth in the Las Vegas metropolitan area at the historical average of five percent could no longer be supported. Planned construction which has not reached the water-hookup stage would be halted. Immediately, one-third of the construction projects would be stopped, and those on the drawing board scrapped. With adequate water, employment in Clark County would have increased from 752,731 in 2005 to 773,143 in 2006. With the water shortage, the REMI model predicts that employment would decline to 690,031 workers in 2006. This represents a 10.75 percent dip below what employment would have been with sufficient water. To show the effects of a water shortage in Clark County on employment, population, income, and output effects, Table 4.1 and Figures 4.1.1 through 4.1.6. were created.

As expected, the decline would be instigated by reduced construction expenditures, with construction employment falling by 60.6 percent in 2006 from 43,811 (with ample water) to 17,269 (as the result of a water-shortage-induced limit to growth)(see Table 4.2). The initial thirty-three percent fall in construction employment, induced through the simulation, is augmented by a secondary reduction of twenty-seven percent. Given the decline in construction and other sectors, fewer housing units are required for construction workers and others who

are displaced by the economic disruption. While the construction industry shows the largest percent reduction, other areas of the economy would also be severely affected.

Again referring to Table 4.2, employment in finance, insurance, and real estate in the first year of the crisis would decline from 54,210 workers with plentiful water to 48,490 workers with a water shortage -- a decrease of 10.55 percent. Retail trade would fall by fourteen percent below where it would be with plentiful water. Wholesale trade would decline by a corresponding 12.14 percent. While the decline in service employment would lag the other sectors, by 2016 service employment would be 11.71 percent below where it would have been without a water shortage. By the year 2029, service employment would be eighteen percent below where it would have been had water supplies remained adequate.

As we learned from the cross-section analysis, a decline in economic growth correlates highly with increased per capita property taxes. With local government tax revenues heavily dependent on property and sales taxes and with gaming tax revenues retarded by aborted casino construction, the specter of a water shortage bodes ill for state and local government finances. The prospect of a government financial crisis in 2006 causes the reduction of employment by government agencies in Clark County from 84,596 with plentiful water to 79,723 in the event of a water shortage. By the year 2020, this initial 5.76 percent decline would balloon to a 20.46 percent reduction in state and local government employment.

The employment effects of a water-shortage-induced cessation of growth would be wide and deep. Real disposable personal income--total purchasing power measured in 1990 dollars--would fall \$2.7 billion below its potential in 2006. This 10.25 percent drop more than doubles to 23.2 percent by the year 2020. The income decline accompanies the reduction in real gross regional product-- the value of all goods and services produced locally also measured in 1990 dollars. In 2006, a water-shortage-induced building moratorium would re-

duce output 14.47 percent below potential. This gap would widen to 23.87 percent by the year 2020.

As local income and employment decline, people migrate. Out-migration would increase apartment and housing vacancies, dropping rents and diminishing property values. Because population adjustment would lag behind employment reductions, the loss of employment opportunities would increase the unemployment rate and retard real wage growth. While total employment would decline 10.75 percent in 2006, population would fall behind its potential by only 5.76 percent. The decline in population (population is predicted to fall from 1,272,700 in 2005 to 1,222,180 in 2006, a four percent decline) would be divided between out-migration, and deterred in-migration. Instead of a projected population growth in 2007, a water shortage results in a population decline of 38,907. With income falling faster than population, per capita disposable income would be 4.76 percent lower because of water-shortage-induced limits to growth. In 2006, a water shortage would cost the typical person \$983 in income; this translates into a loss of \$3,932 for a family of four.

The Long Run Effects of a Water Shortage on Clark County

An unplanned water shortage would have devastating effects on the Las Vegas Valley economy in the short run. Yet we have fashioned an essentially optimistic scenario--one that allows market forces to assuage the grimmest consequences of short-sighted water waste. If a water-shortage-encouraged water conservation--especially with the introduction of higher water rates for residential and commercial users--some growth could be rekindled during 2010 or later. Nevertheless, construction employment would always remain below its forecast level for 2005, the year before the crisis. We forecast that the gap between construction employment with and without adequate water would peak at 69.5 percent in the year 2009. By 2020 this gap would remain below fifty-nine percent. By 2035 construction employment would be 51.09 percent below its potential.

Thus, construction employment would remain depressed below the 2005 level and would not recover by 2035.

Employment in transportation and public utilities—e.g., electric power, natural gas, intrastate trucking—would be modestly influenced by a water shortage in 2006, falling a mere 3.4 percent below potential. However, the gap between employment with and employment without adequate water would continue to increase for this sector until it lagged its potential by over ten percent in 2035.

Employment in finance, insurance, and real estate—a sector that is closely tied to construction activity—would fall 10.55 percent below potential in 2006. This gap would steadily increase, nearly doubling in size to a 19.74 percent shortfall in 2035. Retail and wholesale trade are also closely associated with population. In 2006, the employment gap due to a water shortage would be fourteen and twelve percent for retail and wholesale trade, respectively. By 2035, this gap would increase to nearly 20 and 18.44 percent, respectively.

Many Las Vegans are employed in service jobs. Although the impact of the water shortage on the service sector would be slow to build, with small declines through the end of the decade, service employment would eventually fall more than 18.6 percent below its potential in 2035.

When we aggregate all employment effects (see Table 4.1), we find that a water shortage would cost residents of Clark County 62,700 jobs between 2005 and 2006. In addition, 20,412 jobs that would have been created from growth between 2005 and 2006 would be lost. To be sure some of these jobs would have been filled by migrants to Las Vegas; however, a substantial number would have gone to local residents. High school and college graduates and others entering the labor force would be most affected. Without new job creation and having to compete with experienced, unemployed workers, Las Vegas youth would be forced to look elsewhere for employment.

The Impact of a Las Vegas Water Shortage
on the Nevada Economy

"As goes Clark County, so goes the state of Nevada." We show in Table 4.7 that a water shortage in Clark County would adversely influence the rest of the state of Nevada. A major economic disruption in Clark County--which will contain 62.1 percent of state employment and 63.3 percent of state population by 2005--would send shock waves throughout the state. A water-shortage interruption of growth in 2006 would add 56,191 persons to Nevada's unemployment rolls. Such a jump would severely strain the unemployment compensation system. Increased numbers of claimants for public assistance would be expected while tax revenue would decline sharply. The revenue shortfall would create a fiscal crisis, requiring either a sharp decline in government services or a drastic increase in tax rates, or both. By the year 2015 employment by state and local governments would be 12.19 percent below its potential. This downturn would fall to a 13.35 percent gap in the year 2020. The decline in personal disposable income would be greater than the decline in employment or population, reaching a 15.67 percent low in the year 2020. As a result, per capita income in the state of Nevada would be \$629 lower in 2006, and would decline further to a drop of nearly 4 percent per year in 2032. Thus, state per capita income would not recover for many years.

The Impact of a Water Shortage
on the Rural Nevada Economy

A water shortage would reduce economic activity in Nye (Table 4.3) and Lincoln Counties (Table 4.4), and the rest of the state (which includes White Pine County--shown in Table 4.5). While some time would be required for disruption in Clark County to filter into the other counties, employment would eventually fall 4.2 percent below its potential in Nye County, 4.6 percent below its potential in Lincoln County, and 1.5 percent below its potential in the rest of the state. Population would decline by 3.6 percent in Nye, 4.3 percent in Lincoln, and 1.5

percent in the rest of the state. A water shortage in Clark County would reduce income in Nye County by 5.8 percent, in Lincoln County by 4.5 percent, and in the rest of rural Nevada by 1.6 percent. By the year 2020, an economic disruption in Clark County would cost every rural resident \$84 in lost disposable income.

Because population would eventually adjust to employment changes, the decline in rural per capita income would bottom out in 2014, and by 2031 return to the level it would have been without the water shortage. An increase in per capita income in rural areas of \$24 in 2035 would signal a dubious return to their twenty-five years of lost per capita income.

Conclusions

Without assured new water sources after 2006, Las Vegas will suffer severe economic reversals. The decline in activity will be strongest in construction but will stretch across all important sectors of the economy. After many years of decline or stagnation, there will be moderate recovery, provided that community reactions and adjustments to the water shortage are effective. However, the economy in all important respects will remain well below the level it would have reached with adequate water.

A decline in the Las Vegas economy, even with limited recovery, will be felt throughout the state of Nevada, with a general decline in the quality of life for all Nevadans and special state fiscal problems as well.

Table 4.1
Impact of Water Shortage on Clark County, Nevada

Year	Government Employment			Total Employment			Population		
	Thousands of People			Thousands of People			Thousands of People		
	Control	Water Shortage	Percent Difference	Control	Water Shortage	Percent Difference	Control	Water Shortage	Percent Difference
1990	52.272	52.272	0.00%	451.859	451.859	0.00%	820.465	820.465	0.00%
1991	54.048	54.048	0.00%	469.618	469.618	0.00%	853.599	853.599	0.00%
1992	55.832	55.832	0.00%	484.457	484.457	0.00%	886.732	886.732	0.00%
1993	58.137	58.137	0.00%	501.750	501.750	0.00%	919.866	919.866	0.00%
1994	60.172	60.172	0.00%	516.904	516.904	0.00%	952.999	952.999	0.00%
1995	61.693	61.693	0.00%	543.658	543.658	0.00%	986.133	986.133	0.00%
1996	63.422	63.422	0.00%	574.501	574.501	0.00%	1019.266	1019.266	0.00%
1997	65.791	65.791	0.00%	595.560	595.560	0.00%	1052.400	1052.400	0.00%
1998	68.203	68.203	0.00%	611.824	611.824	0.00%	1085.533	1085.533	0.00%
1999	70.509	70.509	0.00%	636.094	636.094	0.00%	1118.667	1118.667	0.00%
2000	72.272	72.272	0.00%	653.955	653.955	0.00%	1151.800	1151.800	0.00%
2001	74.218	74.218	0.00%	673.382	673.382	0.00%	1175.980	1175.980	0.00%
2002	76.354	76.354	0.00%	693.466	693.466	0.00%	1200.160	1200.160	0.00%
2003	78.398	78.398	0.00%	712.442	712.442	0.00%	1224.340	1224.340	0.00%
2004	80.391	80.391	0.00%	732.156	732.156	0.00%	1248.520	1248.520	0.00%
2005	82.419	82.419	0.00%	752.731	752.731	0.00%	1272.700	1272.700	0.00%
2006	84.596	79.723	-5.76%	773.143	690.031	-10.75%	1296.880	1222.180	-5.76%
2007	86.934	77.867	-10.43%	791.013	698.464	-11.70%	1321.060	1183.273	-10.43%
2008	89.311	79.004	-11.54%	806.727	704.434	-12.68%	1345.240	1189.999	-11.54%
2009	91.731	79.842	-12.96%	822.582	709.971	-13.69%	1369.420	1191.943	-12.96%
2010	94.206	80.763	-14.27%	838.444	716.786	-14.51%	1393.600	1194.733	-14.27%
2011	96.270	81.338	-15.51%	855.154	724.657	-15.26%	1414.440	1195.060	-15.51%
2012	98.318	81.918	-16.68%	870.161	732.850	-15.78%	1435.280	1195.875	-16.68%
2013	100.364	82.539	-17.76%	885.132	741.121	-16.27%	1456.120	1197.513	-17.76%
2014	102.440	83.755	-18.24%	900.089	751.124	-16.55%	1476.960	1207.562	-18.24%
2015	104.419	84.840	-18.75%	913.047	758.285	-16.95%	1497.800	1216.963	-18.75%
2016	106.343	85.830	-19.29%	924.024	763.059	-17.42%	1518.640	1225.694	-19.29%
2017	108.283	86.865	-19.78%	937.124	770.878	-17.74%	1539.480	1234.971	-19.78%
2018	110.264	88.013	-20.18%	950.113	778.523	-18.06%	1560.320	1245.447	-20.18%
2019	112.226	89.253	-20.47%	961.450	784.735	-18.38%	1581.160	1257.497	-20.47%
2020	114.143	90.789	-20.46%	971.146	790.707	-18.58%	1602.000	1274.231	-20.46%
2021	114.577	91.261	-20.35%	971.336	789.987	-18.67%	1622.580	1292.385	-20.35%
2022	114.874	91.692	-20.18%	976.220	792.788	-18.79%	1643.161	1311.571	-20.18%
2023	116.461	93.169	-20.00%	984.384	797.744	-18.96%	1663.000	1330.400	-20.00%
2024	118.111	94.678	-19.84%	994.089	804.814	-19.04%	1684.322	1350.153	-19.84%
2025	119.743	96.178	-19.68%	1002.101	811.802	-18.99%	1704.903	1369.378	-19.68%
2026	121.403	97.681	-19.54%	1011.632	817.905	-19.15%	1725.483	1388.324	-19.54%
2027	123.107	99.151	-19.46%	1020.926	823.683	-19.32%	1746.064	1406.280	-19.46%
2028	124.808	100.645	-19.36%	1028.557	829.326	-19.37%	1766.644	1424.622	-19.36%
2029	126.529	102.185	-19.24%	1037.459	837.437	-19.28%	1787.224	1443.362	-19.24%
2030	128.262	105.239	-17.95%	1044.532	854.323	-18.21%	1807.805	1483.304	-17.95%
2031	130.037	108.477	-16.58%	1052.948	868.050	-17.56%	1824.864	1522.302	-16.58%
2032	131.886	110.573	-16.16%	1061.113	878.496	-17.21%	1842.426	1544.690	-16.16%
2033	133.765	112.630	-15.80%	1067.543	886.061	-17.00%	1859.890	1566.027	-15.80%
2034	135.758	114.797	-15.44%	1075.388	896.013	-16.68%	1878.419	1588.391	-15.44%
2035	137.879	117.073	-15.09%	1083.021	904.431	-16.49%	1898.178	1611.743	-15.09%

Table 4.1 (continued)
Impact of Water Shortage on Clark County, Nevada

Year	Disposable Personal Income			Gross Regional Product			Per Capita Income		
	Billions of 1990 Dollars			Billions of 1990 Dollars			1990 Dollars		
	Control	Water Shortage	Percent Difference	Control	Water Shortage	Percent Difference	Control	Water Shortage	Percent Difference
1990	\$12.521	\$12.521	0.00%	\$20.153	\$20.153	0.00%	\$15,261	\$15,261	0.00%
1991	\$13.397	\$13.397	0.00%	\$21.074	\$21.074	0.00%	\$15,695	\$15,695	0.00%
1992	\$14.165	\$14.165	0.00%	\$21.718	\$21.718	0.00%	\$15,974	\$15,974	0.00%
1993	\$15.117	\$15.117	0.00%	\$22.703	\$22.703	0.00%	\$16,434	\$16,434	0.00%
1994	\$15.957	\$15.957	0.00%	\$23.705	\$23.705	0.00%	\$16,744	\$16,744	0.00%
1995	\$16.689	\$16.689	0.00%	\$25.470	\$25.470	0.00%	\$16,924	\$16,924	0.00%
1996	\$17.616	\$17.616	0.00%	\$27.170	\$27.170	0.00%	\$17,283	\$17,283	0.00%
1997	\$18.292	\$18.292	0.00%	\$28.374	\$28.374	0.00%	\$17,381	\$17,381	0.00%
1998	\$19.319	\$19.319	0.00%	\$29.454	\$29.454	0.00%	\$17,797	\$17,797	0.00%
1999	\$20.376	\$20.376	0.00%	\$31.155	\$31.155	0.00%	\$18,215	\$18,215	0.00%
2000	\$20.635	\$20.635	0.00%	\$32.400	\$32.400	0.00%	\$17,915	\$17,915	0.00%
2001	\$21.550	\$21.550	0.00%	\$33.566	\$33.566	0.00%	\$18,325	\$18,325	0.00%
2002	\$22.535	\$22.535	0.00%	\$34.809	\$34.809	0.00%	\$18,777	\$18,777	0.00%
2003	\$23.529	\$23.529	0.00%	\$36.049	\$36.049	0.00%	\$19,218	\$19,218	0.00%
2004	\$24.578	\$24.578	0.00%	\$37.367	\$37.367	0.00%	\$19,686	\$19,686	0.00%
2005	\$25.665	\$25.665	0.00%	\$38.760	\$38.760	0.00%	\$20,166	\$20,166	0.00%
2006	\$26.759	\$24.016	-10.25%	\$40.190	\$34.375	-14.47%	\$20,633	\$19,650	-4.76%
2007	\$27.814	\$23.884	-14.13%	\$41.499	\$34.656	-16.49%	\$21,054	\$20,185	-4.13%
2008	\$28.853	\$24.343	-15.63%	\$42.723	\$35.127	-17.78%	\$21,448	\$20,457	-4.62%
2009	\$29.908	\$24.803	-17.07%	\$43.977	\$35.635	-18.97%	\$21,840	\$20,809	-4.72%
2010	\$30.986	\$25.288	-18.39%	\$45.250	\$36.223	-19.95%	\$22,235	\$21,166	-4.81%
2011	\$32.307	\$25.985	-19.57%	\$46.549	\$36.857	-20.82%	\$22,841	\$21,743	-4.81%
2012	\$33.074	\$26.271	-20.57%	\$47.777	\$37.534	-21.44%	\$23,044	\$21,968	-4.67%
2013	\$34.120	\$26.794	-21.47%	\$49.010	\$38.228	-22.00%	\$23,432	\$22,375	-4.51%
2014	\$35.185	\$27.487	-21.88%	\$50.251	\$39.080	-22.23%	\$23,823	\$22,762	-4.45%
2015	\$36.220	\$28.128	-22.34%	\$51.403	\$39.776	-22.62%	\$24,182	\$23,114	-4.42%
2016	\$37.218	\$28.717	-22.84%	\$52.342	\$40.267	-23.07%	\$24,507	\$23,430	-4.40%
2017	\$38.273	\$29.386	-23.22%	\$53.519	\$41.017	-23.36%	\$24,861	\$23,795	-4.29%
2018	\$39.351	\$30.096	-23.52%	\$54.696	\$41.766	-23.64%	\$25,220	\$24,165	-4.18%
2019	\$40.424	\$31.191	-22.84%	\$55.808	\$42.498	-23.85%	\$25,566	\$24,804	-2.98%
2020	\$41.487	\$31.854	-23.22%	\$56.853	\$43.282	-23.87%	\$25,897	\$24,998	-3.47%
2021	\$42.048	\$32.158	-23.52%	\$57.202	\$43.617	-23.75%	\$25,914	\$24,883	-3.98%
2022	\$42.632	\$32.532	-23.69%	\$57.875	\$44.199	-23.63%	\$25,945	\$24,804	-4.40%
2023	\$43.575	\$33.304	-23.57%	\$58.808	\$44.953	-23.56%	\$26,203	\$25,033	-4.46%
2024	\$44.557	\$34.166	-23.32%	\$59.808	\$45.783	-23.45%	\$26,454	\$25,306	-4.34%
2025	\$45.533	\$35.056	-23.01%	\$60.727	\$46.735	-23.04%	\$26,707	\$25,600	-4.15%
2026	\$46.544	\$35.965	-22.73%	\$61.722	\$47.501	-23.04%	\$26,974	\$25,905	-3.96%
2027	\$47.578	\$36.897	-22.45%	\$62.708	\$48.248	-23.06%	\$27,249	\$26,237	-3.71%
2028	\$48.615	\$37.876	-22.09%	\$63.624	\$48.997	-22.99%	\$27,518	\$26,587	-3.39%
2029	\$49.683	\$38.812	-21.88%	\$64.603	\$49.861	-22.82%	\$27,799	\$26,890	-3.27%
2030	\$50.753	\$39.719	-21.74%	\$65.500	\$51.529	-21.33%	\$28,074	\$26,778	-4.62%
2031	\$51.863	\$40.676	-21.57%	\$66.469	\$52.969	-20.31%	\$28,420	\$26,720	-5.98%
2032	\$53.008	\$41.696	-21.34%	\$67.433	\$54.681	-18.91%	\$28,771	\$26,993	-6.18%
2033	\$54.166	\$43.392	-19.89%	\$68.327	\$55.017	-19.48%	\$29,123	\$27,709	-4.86%
2034	\$55.387	\$45.146	-18.49%	\$69.304	\$56.095	-19.06%	\$29,486	\$28,422	-3.61%
2035	\$56.663	\$46.509	-17.92%	\$70.285	\$57.093	-18.77%	\$29,851	\$28,856	-3.33%

Figure 4.1.1.1
Impact of Water Shortage on Government Employment
Clark County, Nevada

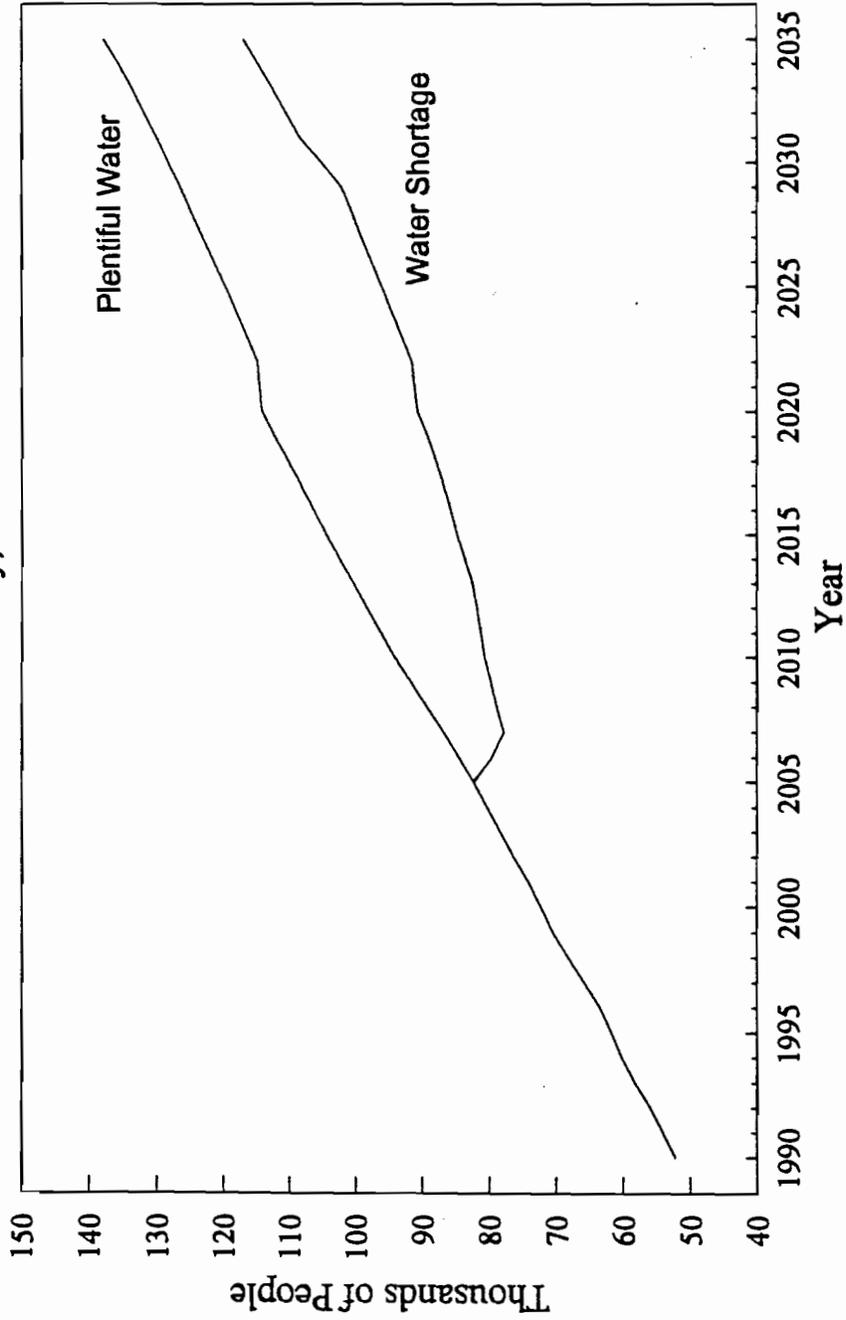


Figure 4.1.2
Impact of Water Shortage on Total Employment
Clark County, Nevada

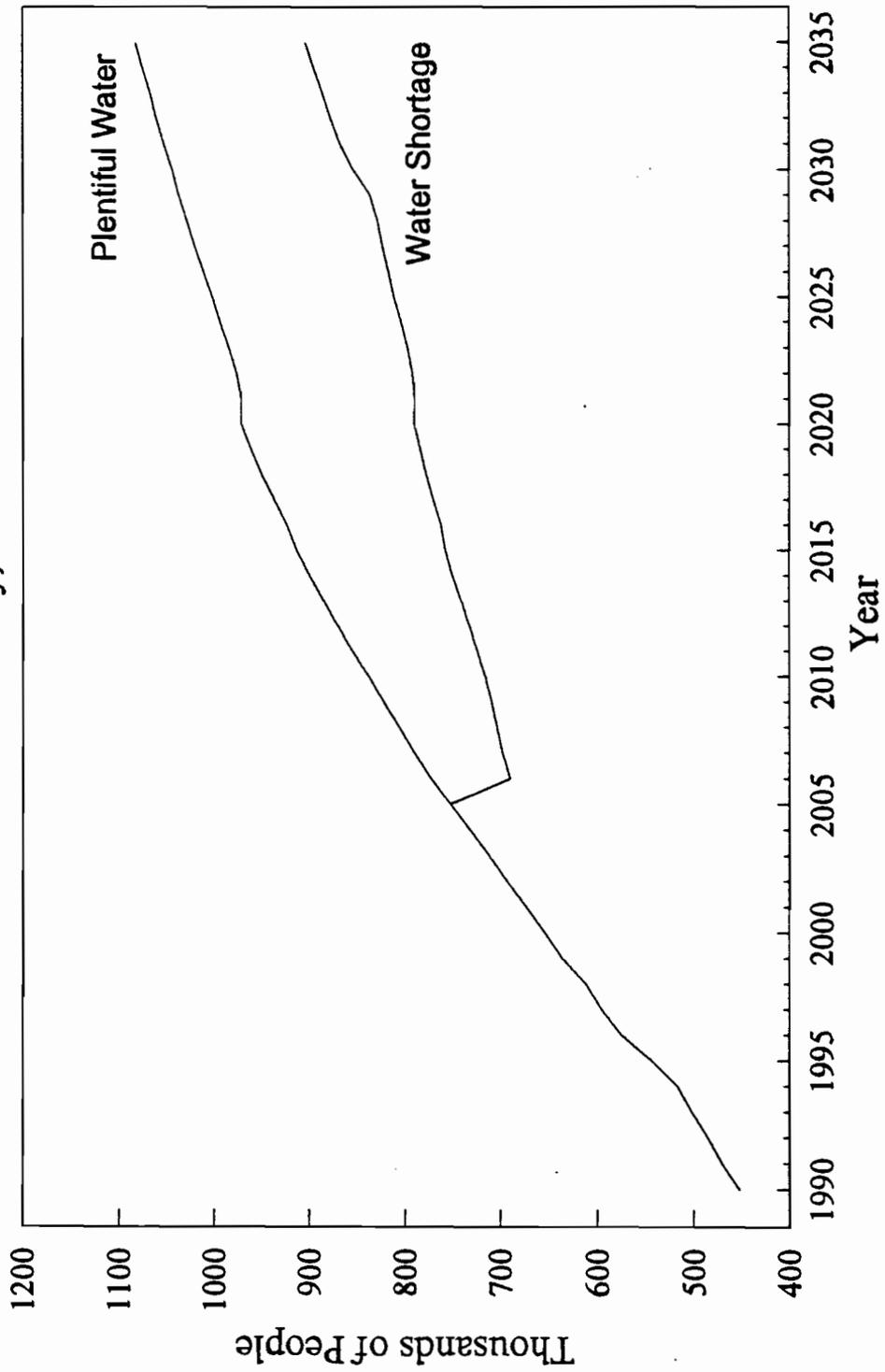


Figure 4.1.3
Impact of Water Shortage on Population
Clark County, Nevada

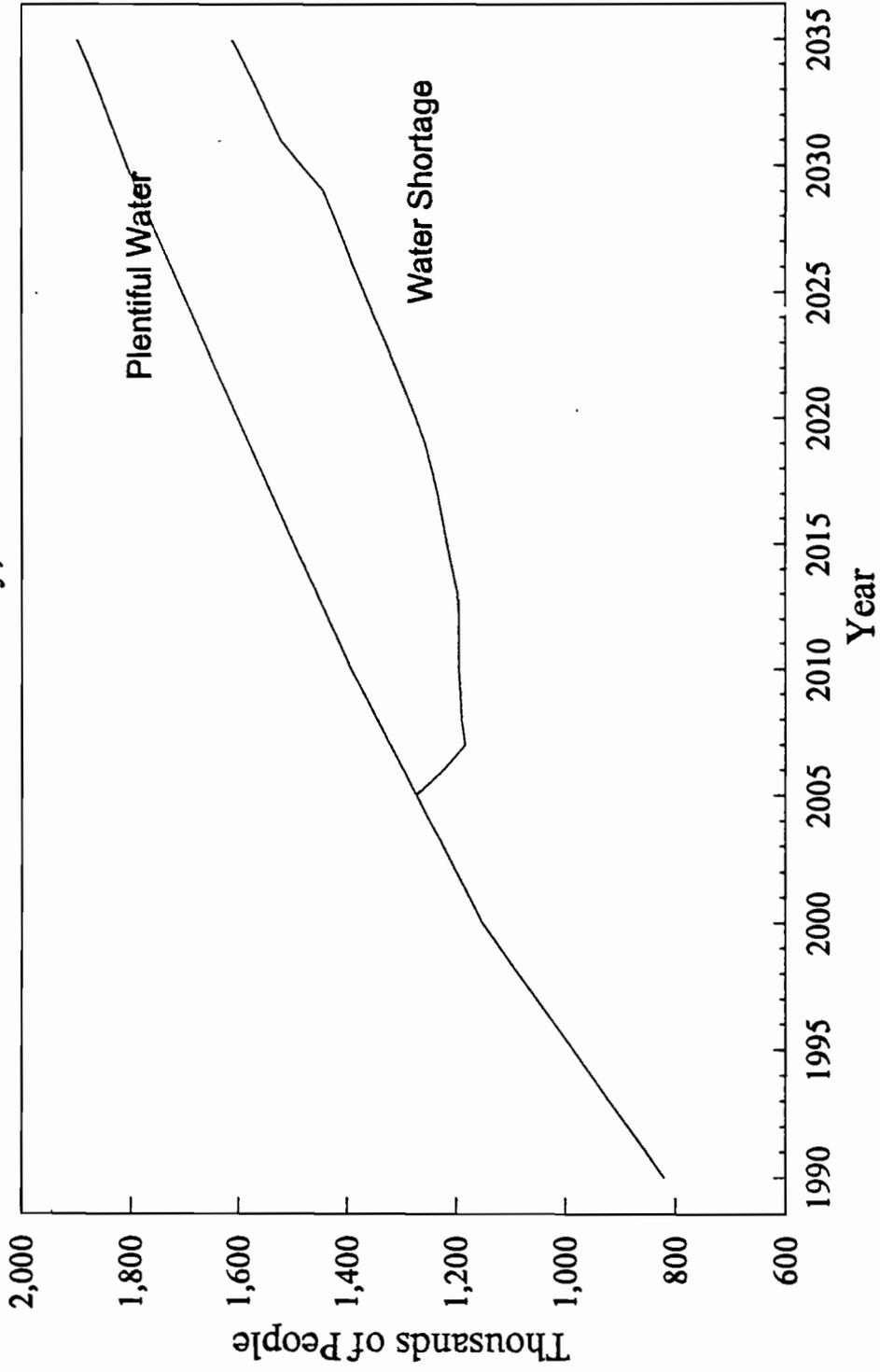


Figure 4.1.4
Impact of Water Shortage on Disposable Personal Income
Clark County, Nevada

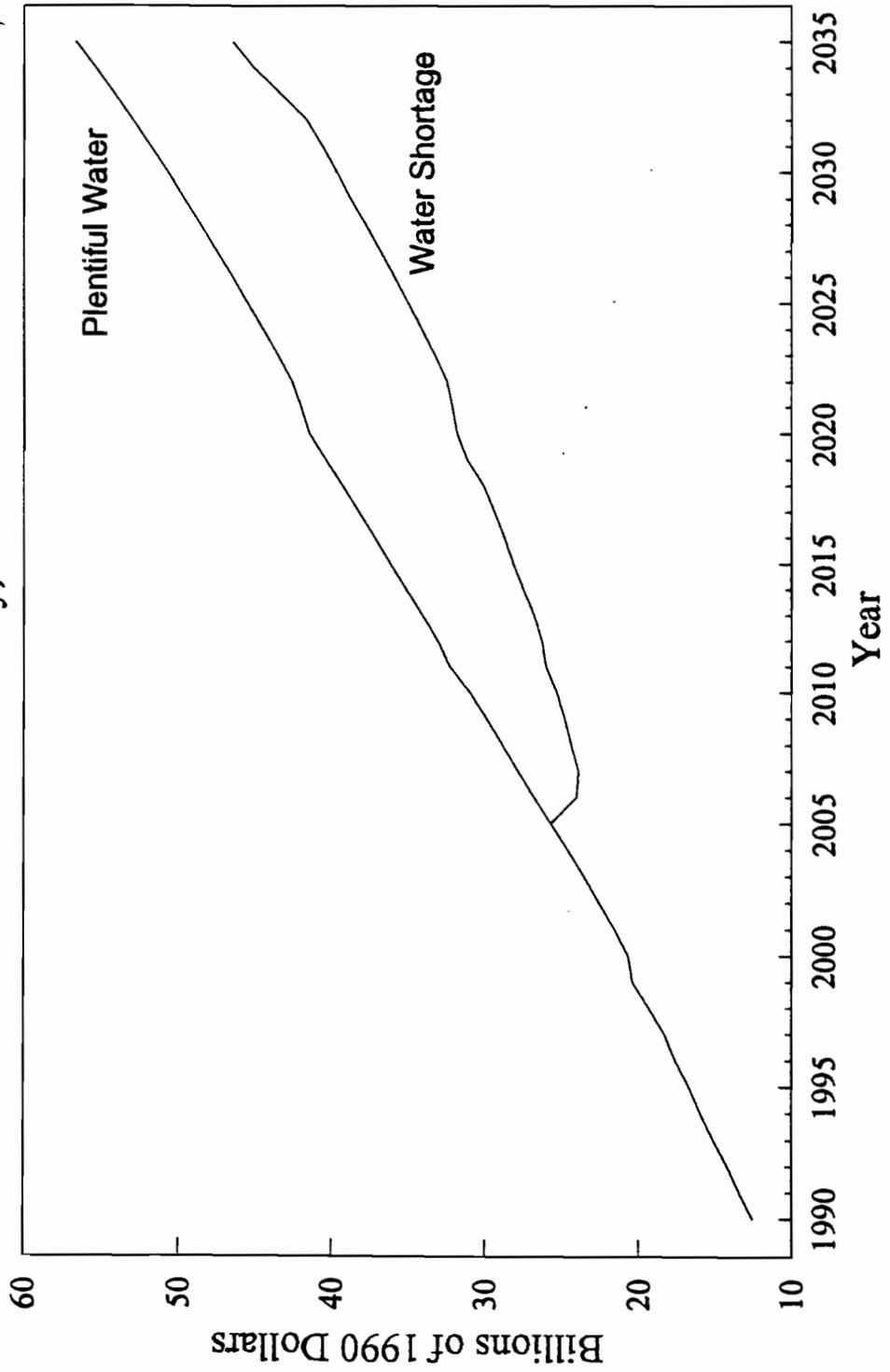


Figure 4.1.5
Impact of Water Shortage on Gross Regional Product
Clark County, Nevada

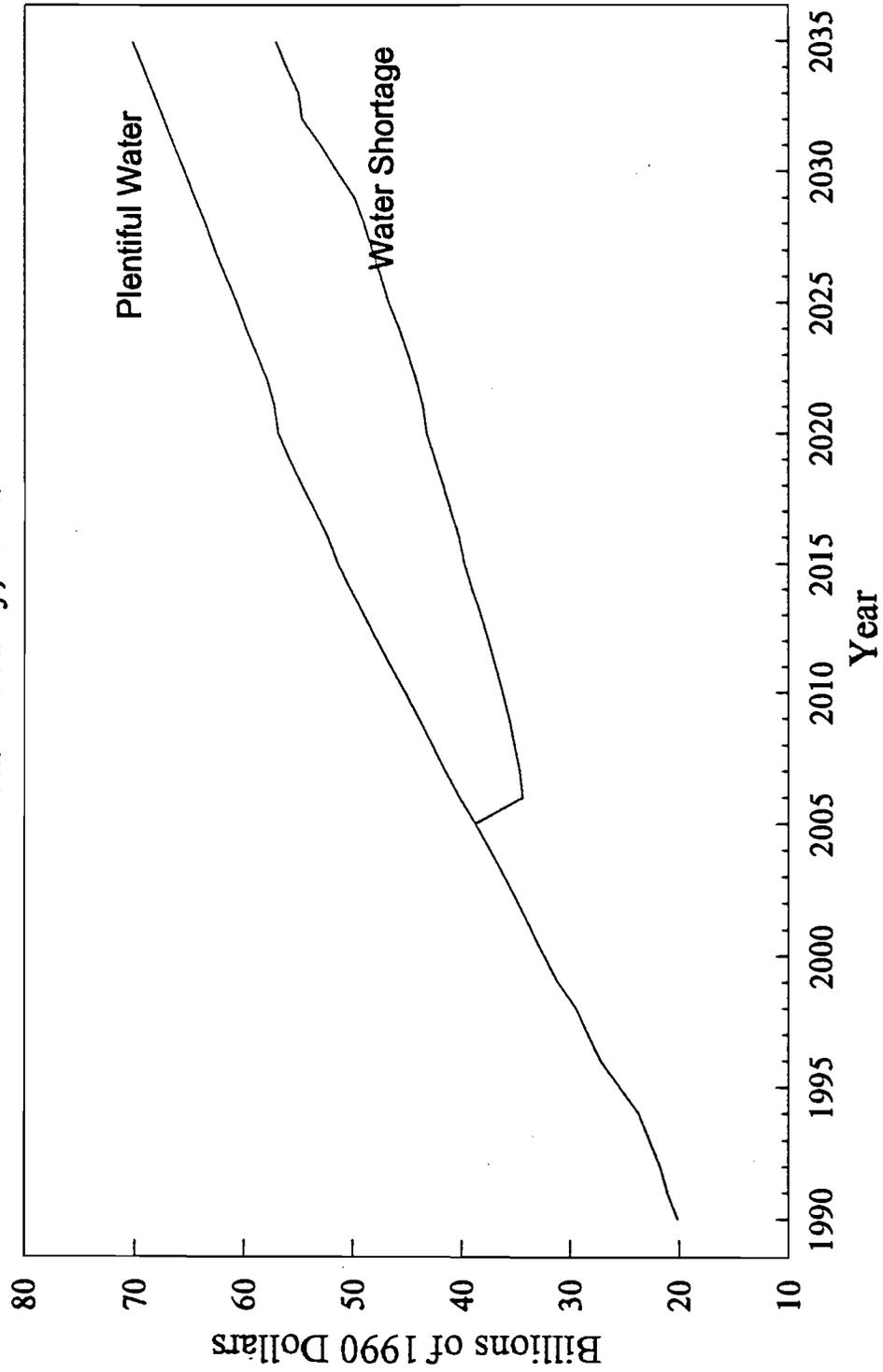


Figure 4.1.6
Impact of Water Shortage on Per Capita Income
Clark County, Nevada

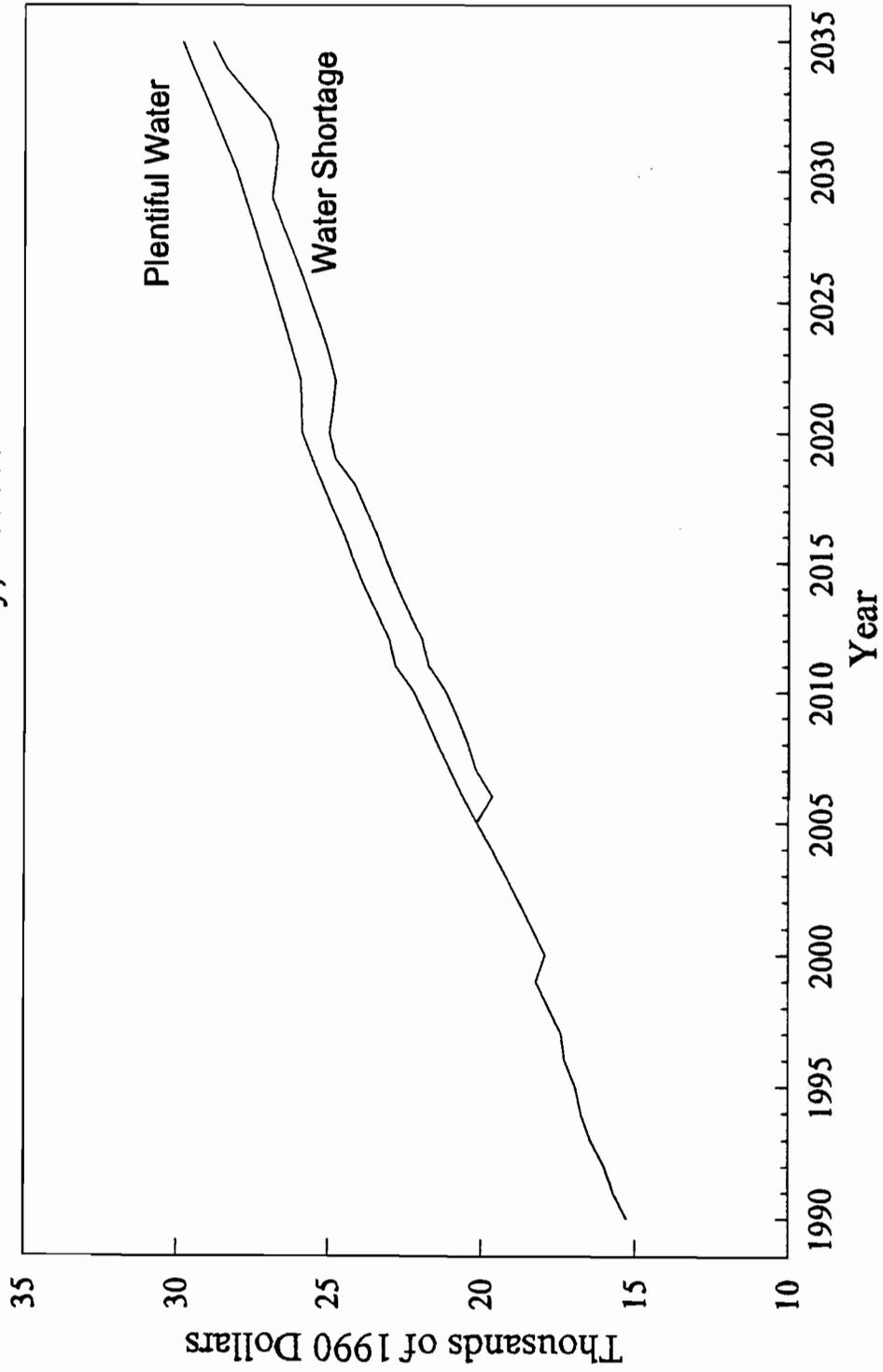


Table 4.2
Detailed Impact of Water Shortage on Clark County Employment

Year	Contract Construction			Transportation and Public Utilities			Finance, Insurance and Real Estate		
	Thousands of Employees			Thousands of Employees			Thousands of Employees		
	Control	Water Shortage	Percent Difference	Control	Water Shortage	Percent Difference	Control	Water Shortage	Percent Difference
1990	31.981	31.981	0.00%	19.260	19.260	0.00%	34.731	34.731	0.00%
1991	32.472	32.472	0.00%	19.619	19.619	0.00%	36.889	36.889	0.00%
1992	34.018	34.018	0.00%	20.120	20.120	0.00%	37.840	37.840	0.00%
1993	34.099	34.099	0.00%	20.528	20.528	0.00%	38.178	38.178	0.00%
1994	35.552	35.552	0.00%	20.827	20.827	0.00%	38.369	38.369	0.00%
1995	37.016	37.016	0.00%	21.790	21.790	0.00%	40.062	40.062	0.00%
1996	38.587	38.587	0.00%	22.630	22.630	0.00%	41.876	41.876	0.00%
1997	40.274	40.274	0.00%	23.201	23.201	0.00%	42.810	42.810	0.00%
1998	39.456	39.456	0.00%	23.150	23.150	0.00%	42.651	42.651	0.00%
1999	39.628	39.628	0.00%	23.263	23.263	0.00%	43.871	43.871	0.00%
2000	39.097	39.097	0.00%	24.207	24.207	0.00%	46.719	46.719	0.00%
2001	39.812	39.812	0.00%	24.403	24.403	0.00%	47.898	47.898	0.00%
2002	40.551	40.551	0.00%	24.625	24.625	0.00%	49.116	49.116	0.00%
2003	41.290	41.290	0.00%	24.843	24.843	0.00%	50.275	50.275	0.00%
2004	42.088	42.088	0.00%	25.093	25.093	0.00%	51.497	51.497	0.00%
2005	42.941	42.941	0.00%	25.377	25.377	0.00%	52.806	52.806	0.00%
2006	43.831	17.269	-60.60%	25.604	24.731	-3.41%	54.210	48.490	-10.55%
2007	44.548	13.725	-69.19%	25.712	24.819	-3.47%	55.393	49.255	-11.08%
2008	45.195	14.187	-68.61%	25.769	24.820	-3.68%	56.436	49.805	-11.75%
2009	45.845	13.983	-69.50%	25.827	24.757	-4.14%	57.482	50.096	-12.85%
2010	45.719	14.447	-68.40%	25.889	24.742	-4.43%	58.540	50.584	-13.59%
2011	46.438	15.190	-67.29%	25.967	24.734	-4.75%	59.522	50.999	-14.32%
2012	47.123	15.956	-66.14%	26.022	24.729	-4.97%	60.436	51.431	-14.90%
2013	47.819	16.732	-65.01%	26.081	24.720	-5.22%	61.368	51.874	-15.47%
2014	48.525	15.198	-68.68%	26.141	24.739	-5.36%	62.310	52.509	-15.73%
2015	49.167	18.413	-62.55%	26.167	24.683	-5.67%	63.129	52.902	-16.20%
2016	48.603	18.202	-62.55%	26.150	24.568	-6.05%	63.715	53.056	-16.73%
2017	49.281	18.845	-61.76%	26.184	24.518	-6.36%	64.566	53.506	-17.13%
2018	49.952	19.471	-61.02%	26.212	24.461	-6.68%	65.397	53.939	-17.52%
2019	50.573	20.062	-60.33%	26.216	24.378	-7.01%	66.140	54.307	-17.89%
2020	49.425	19.933	-59.67%	26.241	24.365	-7.15%	66.960	54.967	-17.91%
2021	49.411	20.367	-58.78%	26.256	24.350	-7.26%	67.557	55.485	-17.87%
2022	49.699	20.908	-57.93%	26.266	24.314	-7.43%	68.134	55.938	-17.90%
2023	49.974	21.409	-57.16%	26.267	24.250	-7.68%	68.682	56.305	-18.02%
2024	50.192	21.844	-56.48%	26.240	24.170	-7.89%	69.125	56.600	-18.12%
2025	50.439	22.254	-55.88%	26.230	24.132	-8.00%	69.621	57.103	-17.98%
2026	50.110	22.925	-54.25%	26.163	23.987	-8.32%	69.883	57.143	-18.23%
2027	50.296	23.217	-53.84%	26.122	23.863	-8.65%	70.268	57.268	-18.50%
2028	50.466	23.472	-53.49%	26.078	23.754	-8.91%	70.633	57.439	-18.68%
2029	50.614	23.723	-53.13%	26.024	23.617	-9.25%	70.967	57.504	-18.97%
2030	51.075	24.077	-52.86%	25.963	23.502	-9.48%	71.266	57.626	-19.14%
2031	51.523	24.515	-52.42%	25.977	23.455	-9.71%	71.968	58.071	-19.31%
2032	51.959	24.925	-52.03%	25.985	23.400	-9.95%	72.650	58.491	-19.49%
2033	52.376	25.303	-51.69%	25.983	23.356	-10.11%	73.305	58.945	-19.59%
2034	52.774	25.674	-51.35%	25.974	23.285	-10.35%	73.931	59.300	-19.79%
2035	53.149	25.995	-51.09%	25.954	23.250	-10.42%	74.524	59.813	-19.74%

Table 4.2
Detailed Impact of Water Shortage on Clark County Employment

Year	Retail Trade			Wholesale Trade			Services		
	Thousands of Employees			Thousands of Employees			Thousands of Employees		
	Control	Water Shortage	Percent Difference	Control	Water Shortage	Percent Difference	Control	Water Shortage	Percent Difference
1990	72.704	72.704	0.00%	12.839	12.839	0.00%	213.909	213.909	0.00%
1991	74.448	74.448	0.00%	13.125	13.125	0.00%	222.943	222.943	0.00%
1992	76.723	76.723	0.00%	13.668	13.668	0.00%	228.903	228.903	0.00%
1993	80.070	80.070	0.00%	14.384	14.384	0.00%	238.807	238.807	0.00%
1994	82.308	82.308	0.00%	14.441	14.441	0.00%	246.661	246.661	0.00%
1995	85.658	85.658	0.00%	14.945	14.945	0.00%	262.703	262.703	0.00%
1996	89.237	89.237	0.00%	15.565	15.565	0.00%	281.669	281.669	0.00%
1997	92.544	92.544	0.00%	16.541	16.541	0.00%	293.833	293.833	0.00%
1998	94.643	94.643	0.00%	17.126	17.126	0.00%	306.949	306.949	0.00%
1999	95.719	95.719	0.00%	16.905	16.905	0.00%	326.579	326.579	0.00%
2000	99.756	99.756	0.00%	16.841	16.841	0.00%	339.092	339.092	0.00%
2001	101.606	101.606	0.00%	17.170	17.170	0.00%	351.541	351.541	0.00%
2002	103.524	103.524	0.00%	17.509	17.509	0.00%	364.533	364.533	0.00%
2003	105.373	105.373	0.00%	17.829	17.829	0.00%	376.847	376.847	0.00%
2004	107.326	107.326	0.00%	18.176	18.176	0.00%	389.547	389.547	0.00%
2005	109.430	109.430	0.00%	18.550	18.550	0.00%	402.932	402.932	0.00%
2006	111.674	96.028	-14.01%	18.939	16.640	-12.14%	415.988	415.614	-0.09%
2007	113.428	96.470	-14.95%	19.251	16.881	-12.31%	427.541	427.926	0.09%
2008	114.940	97.331	-15.32%	19.508	17.023	-12.74%	437.448	430.012	-1.70%
2009	116.456	97.683	-16.12%	19.767	17.061	-13.69%	447.274	429.831	-3.90%
2010	117.978	98.358	-16.63%	20.026	17.204	-14.09%	456.995	432.363	-5.39%
2011	119.253	98.849	-17.11%	20.276	17.338	-14.49%	467.898	436.081	-6.80%
2012	120.418	99.332	-17.51%	20.496	17.477	-14.73%	477.560	440.167	-7.83%
2013	121.593	99.816	-17.91%	20.719	17.609	-15.01%	487.275	444.249	-8.83%
2014	122.771	100.660	-18.01%	20.944	17.788	-15.07%	497.023	448.762	-9.71%
2015	123.733	101.078	-18.31%	21.124	17.871	-15.40%	505.410	451.432	-10.68%
2016	124.208	101.018	-18.67%	21.219	17.860	-15.83%	514.183	453.972	-11.71%
2017	125.194	101.470	-18.95%	21.410	17.957	-16.13%	522.761	457.625	-12.46%
2018	126.135	101.892	-19.22%	21.595	18.042	-16.45%	531.308	461.122	-13.21%
2019	126.932	102.218	-19.47%	21.744	18.098	-16.77%	538.607	463.417	-13.96%
2020	127.825	103.078	-19.36%	21.926	18.249	-16.77%	547.169	467.665	-14.53%
2021	128.415	103.733	-19.22%	22.066	18.375	-16.73%	553.399	470.777	-14.93%
2022	128.948	104.280	-19.13%	22.203	18.479	-16.77%	559.532	473.364	-15.40%
2023	129.421	104.675	-19.12%	22.332	18.556	-16.91%	565.558	475.578	-15.91%
2024	129.725	104.934	-19.11%	22.423	18.611	-17.00%	570.256	477.532	-16.26%
2025	130.084	105.564	-18.85%	22.540	18.744	-16.84%	576.101	479.892	-16.70%
2026	130.046	105.337	-19.00%	22.570	18.708	-17.11%	580.226	480.892	-17.12%
2027	130.222	105.258	-19.17%	22.650	18.712	-17.39%	584.695	482.198	-17.53%
2028	130.363	105.242	-19.27%	22.725	18.735	-17.56%	589.091	484.586	-17.74%
2029	130.443	105.032	-19.48%	22.791	18.719	-17.87%	593.324	485.754	-18.13%
2030	130.462	104.931	-19.57%	22.849	18.736	-18.00%	597.389	488.186	-18.28%
2031	131.165	105.338	-19.69%	23.010	18.834	-18.15%	603.989	492.734	-18.42%
2032	131.828	105.713	-19.81%	23.164	18.920	-18.32%	610.469	497.166	-18.56%
2033	132.438	106.110	-19.88%	23.311	19.028	-18.37%	616.795	502.565	-18.52%
2034	132.993	106.368	-20.02%	23.447	19.095	-18.56%	622.960	506.716	-18.66%
2035	133.485	106.855	-19.95%	23.572	19.225	-18.44%	628.961	512.226	-18.56%

Table 4.3
Impact of Water Shortage on Nye County, Nevada

Year	Government Employment			Total Employment			Population		
	Thousands of People			Thousands of People			Thousands of People		
	Control	Water Shortage	Percent Difference	Control	Water Shortage	Percent Difference	Control	Water Shortage	Percent Difference
1990	0.858	0.858	0.00%	12.339	12.339	0.00%	16.994	16.994	0.00%
1991	0.887	0.887	0.00%	12.646	12.646	0.00%	17.656	17.656	0.00%
1992	0.919	0.919	0.00%	12.866	12.866	0.00%	18.315	18.315	0.00%
1993	0.956	0.956	0.00%	12.984	12.984	0.00%	19.032	19.032	0.00%
1994	0.996	0.996	0.00%	13.873	13.873	0.00%	19.834	19.834	0.00%
1995	1.031	1.031	0.00%	14.718	14.718	0.00%	20.598	20.598	0.00%
1996	1.063	1.063	0.00%	15.238	15.238	0.00%	21.269	21.269	0.00%
1997	1.102	1.102	0.00%	15.431	15.431	0.00%	21.929	21.929	0.00%
1998	1.142	1.142	0.00%	15.513	15.513	0.00%	22.605	22.605	0.00%
1999	1.183	1.183	0.00%	16.339	16.339	0.00%	23.316	23.316	0.00%
2000	1.231	1.231	0.00%	17.536	17.536	0.00%	24.188	24.188	0.00%
2001	1.279	1.279	0.00%	17.807	17.807	0.00%	25.074	25.074	0.00%
2002	1.322	1.322	0.00%	18.102	18.102	0.00%	25.854	25.854	0.00%
2003	1.365	1.365	0.00%	18.409	18.409	0.00%	26.642	26.642	0.00%
2004	1.409	1.409	0.00%	18.724	18.724	0.00%	27.419	27.419	0.00%
2005	1.452	1.452	0.00%	19.054	19.054	0.00%	28.195	28.195	0.00%
2006	1.496	1.494	-0.12%	19.299	19.261	-0.19%	28.971	28.936	-0.12%
2007	1.540	1.535	-0.34%	19.475	19.226	-1.28%	29.751	29.649	-0.34%
2008	1.584	1.576	-0.54%	19.644	19.308	-1.71%	30.527	30.360	-0.55%
2009	1.629	1.617	-0.74%	19.815	19.395	-2.12%	31.298	31.067	-0.74%
2010	1.673	1.658	-0.93%	19.991	19.503	-2.44%	32.062	31.762	-0.94%
2011	1.718	1.698	-1.13%	20.220	19.664	-2.75%	32.816	32.443	-1.14%
2012	1.761	1.738	-1.34%	20.445	19.825	-3.03%	33.553	33.104	-1.34%
2013	1.805	1.777	-1.54%	20.666	19.988	-3.28%	34.274	33.746	-1.54%
2014	1.848	1.816	-1.74%	20.884	20.157	-3.48%	34.981	34.373	-1.74%
2015	1.889	1.853	-1.93%	21.097	20.329	-3.64%	35.646	34.959	-1.93%
2016	1.930	1.889	-2.12%	21.300	20.491	-3.80%	36.295	35.527	-2.12%
2017	1.971	1.926	-2.30%	21.495	20.647	-3.95%	36.925	36.076	-2.30%
2018	2.011	1.961	-2.47%	21.690	20.809	-4.06%	37.537	36.608	-2.48%
2019	2.051	1.997	-2.64%	21.879	20.968	-4.16%	38.132	37.124	-2.64%
2020	2.091	2.032	-2.81%	22.058	21.123	-4.24%	38.707	37.623	-2.80%
2021	2.130	2.068	-2.95%	22.271	21.317	-4.28%	39.259	38.102	-2.95%
2022	2.169	2.102	-3.08%	22.444	21.482	-4.29%	39.784	38.561	-3.08%
2023	2.207	2.137	-3.19%	22.619	21.651	-4.28%	40.289	39.003	-3.19%
2024	2.245	2.171	-3.30%	22.791	21.819	-4.27%	40.777	39.432	-3.30%
2025	2.283	2.206	-3.39%	22.958	21.987	-4.23%	41.245	39.848	-3.39%
2026	2.321	2.240	-3.47%	23.115	22.150	-4.18%	41.699	40.254	-3.46%
2027	2.359	2.275	-3.54%	23.267	22.301	-4.15%	42.144	40.654	-3.53%
2028	2.397	2.311	-3.60%	23.415	22.448	-4.13%	42.575	41.043	-3.60%
2029	2.435	2.346	-3.65%	23.554	22.589	-4.10%	42.992	41.422	-3.65%
2030	2.473	2.382	-3.68%	23.688	22.737	-4.01%	43.396	41.797	-3.68%
2031	2.511	2.419	-3.69%	23.815	22.906	-3.82%	43.792	42.176	-3.69%
2032	2.550	2.456	-3.69%	23.939	23.060	-3.67%	44.185	42.556	-3.69%
2033	2.589	2.494	-3.68%	24.059	23.203	-3.56%	44.568	42.928	-3.68%
2034	2.629	2.532	-3.67%	24.172	23.336	-3.46%	44.942	43.294	-3.67%
2035	2.668	2.570	-3.65%	24.284	23.468	-3.36%	45.304	43.652	-3.65%

Table 4.3 (continued)
Impact of Water Shortage on Nye County, Nevada

Year	Personal Disposable Income Billions of 1990 Dollars			Gross Regional Product Billions of 1990 Dollars			Per Capita Income 1990 Dollars		
	Control	Water Shortage	Percent Difference	Control	Water Shortage	Percent Difference	Control	Water Shortage	Percent Difference
1990	\$0.199	\$0.199	0.00%	\$0.616	\$0.616	0.00%	\$11,698	\$11,698	0.00%
1991	\$0.209	\$0.209	0.00%	\$0.626	\$0.626	0.00%	\$11,813	\$11,813	0.00%
1992	\$0.216	\$0.216	0.00%	\$0.634	\$0.634	0.00%	\$11,787	\$11,787	0.00%
1993	\$0.224	\$0.224	0.00%	\$0.646	\$0.646	0.00%	\$11,779	\$11,779	0.00%
1994	\$0.242	\$0.242	0.00%	\$0.705	\$0.705	0.00%	\$12,184	\$12,184	0.00%
1995	\$0.255	\$0.255	0.00%	\$0.757	\$0.757	0.00%	\$12,400	\$12,400	0.00%
1996	\$0.267	\$0.267	0.00%	\$0.779	\$0.779	0.00%	\$12,553	\$12,553	0.00%
1997	\$0.272	\$0.272	0.00%	\$0.790	\$0.790	0.00%	\$12,402	\$12,402	0.00%
1998	\$0.282	\$0.282	0.00%	\$0.799	\$0.799	0.00%	\$12,465	\$12,465	0.00%
1999	\$0.300	\$0.300	0.00%	\$0.852	\$0.852	0.00%	\$12,871	\$12,871	0.00%
2000	\$0.315	\$0.315	0.00%	\$0.944	\$0.944	0.00%	\$13,030	\$13,030	0.00%
2001	\$0.328	\$0.328	0.00%	\$0.967	\$0.967	0.00%	\$13,067	\$13,067	0.00%
2002	\$0.340	\$0.340	0.00%	\$0.993	\$0.993	0.00%	\$13,160	\$13,160	0.00%
2003	\$0.353	\$0.353	0.00%	\$1.020	\$1.020	0.00%	\$13,263	\$13,263	0.00%
2004	\$0.367	\$0.367	0.00%	\$1.049	\$1.049	0.00%	\$13,396	\$13,396	0.00%
2005	\$0.382	\$0.382	0.00%	\$1.080	\$1.080	0.00%	\$13,534	\$13,534	0.00%
2006	\$0.395	\$0.390	-1.27%	\$1.105	\$1.111	0.49%	\$13,619	\$13,461	-1.15%
2007	\$0.406	\$0.398	-2.00%	\$1.127	\$1.118	-0.80%	\$13,644	\$13,417	-1.66%
2008	\$0.417	\$0.406	-2.67%	\$1.149	\$1.133	-1.34%	\$13,663	\$13,372	-2.13%
2009	\$0.428	\$0.414	-3.37%	\$1.171	\$1.149	-1.85%	\$13,685	\$13,321	-2.65%
2010	\$0.440	\$0.423	-3.79%	\$1.194	\$1.167	-2.27%	\$13,712	\$13,318	-2.88%
2011	\$0.452	\$0.433	-4.14%	\$1.220	\$1.187	-2.69%	\$13,762	\$13,344	-3.04%
2012	\$0.464	\$0.443	-4.48%	\$1.246	\$1.208	-3.10%	\$13,814	\$13,374	-3.18%
2013	\$0.475	\$0.453	-4.77%	\$1.272	\$1.228	-3.46%	\$13,873	\$13,417	-3.29%
2014	\$0.488	\$0.463	-4.96%	\$1.298	\$1.249	-3.79%	\$13,939	\$13,481	-3.28%
2015	\$0.500	\$0.474	-5.15%	\$1.324	\$1.270	-4.05%	\$14,016	\$13,555	-3.29%
2016	\$0.512	\$0.485	-5.28%	\$1.350	\$1.292	-4.30%	\$14,098	\$13,642	-3.23%
2017	\$0.524	\$0.495	-5.46%	\$1.376	\$1.313	-4.54%	\$14,188	\$13,729	-3.23%
2018	\$0.536	\$0.507	-5.54%	\$1.402	\$1.335	-4.75%	\$14,287	\$13,839	-3.14%
2019	\$0.549	\$0.518	-5.64%	\$1.428	\$1.358	-4.92%	\$14,393	\$13,950	-3.07%
2020	\$0.561	\$0.529	-5.72%	\$1.454	\$1.380	-5.07%	\$14,504	\$14,069	-3.00%
2021	\$0.574	\$0.541	-5.78%	\$1.483	\$1.406	-5.17%	\$14,628	\$14,200	-2.92%
2022	\$0.587	\$0.553	-5.81%	\$1.508	\$1.429	-5.22%	\$14,752	\$14,336	-2.82%
2023	\$0.600	\$0.565	-5.82%	\$1.533	\$1.453	-5.24%	\$14,883	\$14,478	-2.72%
2024	\$0.613	\$0.577	-5.81%	\$1.559	\$1.477	-5.25%	\$15,021	\$14,630	-2.60%
2025	\$0.625	\$0.589	-5.77%	\$1.584	\$1.502	-5.22%	\$15,165	\$14,790	-2.47%
2026	\$0.639	\$0.602	-5.76%	\$1.610	\$1.527	-5.16%	\$15,317	\$14,952	-2.38%
2027	\$0.652	\$0.615	-5.74%	\$1.635	\$1.551	-5.12%	\$15,470	\$15,117	-2.28%
2028	\$0.666	\$0.627	-5.74%	\$1.660	\$1.576	-5.10%	\$15,632	\$15,285	-2.22%
2029	\$0.679	\$0.640	-5.71%	\$1.685	\$1.600	-5.06%	\$15,799	\$15,461	-2.14%
2030	\$0.693	\$0.654	-5.62%	\$1.711	\$1.625	-4.99%	\$15,971	\$15,650	-2.01%
2031	\$0.707	\$0.668	-5.53%	\$1.736	\$1.654	-4.75%	\$16,148	\$15,840	-1.91%
2032	\$0.722	\$0.682	-5.42%	\$1.762	\$1.681	-4.55%	\$16,330	\$16,037	-1.80%
2033	\$0.736	\$0.697	-5.34%	\$1.788	\$1.709	-4.38%	\$16,518	\$16,233	-1.73%
2034	\$0.751	\$0.712	-5.24%	\$1.814	\$1.737	-4.23%	\$16,712	\$16,438	-1.64%
2035	\$0.766	\$0.726	-5.18%	\$1.840	\$1.765	-4.08%	\$16,912	\$16,642	-1.59%

Table 4.4
Impact of Water Shortage on Lincoln County, Nevada

Year	Government Employment			Total Employment			Population		
	Thousands of People			Thousands of People			Thousands of People		
	Control	Water Shortage	Percent Difference	Control	Water Shortage	Percent Difference	Control	Water Shortage	Percent Difference
1990	0.456	0.456	0.00%	2.303	2.303	0.00%	3.603	3.603	0.00%
1991	0.462	0.462	0.00%	2.336	2.336	0.00%	3.669	3.669	0.00%
1992	0.469	0.469	0.00%	2.349	2.349	0.00%	3.726	3.726	0.00%
1993	0.478	0.478	0.00%	2.353	2.353	0.00%	3.792	3.792	0.00%
1994	0.488	0.488	0.00%	2.488	2.488	0.00%	3.876	3.876	0.00%
1995	0.496	0.496	0.00%	2.632	2.632	0.00%	3.958	3.958	0.00%
1996	0.505	0.505	0.00%	2.729	2.729	0.00%	4.030	4.030	0.00%
1997	0.516	0.516	0.00%	2.756	2.756	0.00%	4.095	4.095	0.00%
1998	0.527	0.527	0.00%	2.764	2.764	0.00%	4.160	4.160	0.00%
1999	0.539	0.539	0.00%	2.900	2.900	0.00%	4.239	4.239	0.00%
2000	0.553	0.553	0.00%	3.065	3.065	0.00%	4.337	4.337	0.00%
2001	0.566	0.566	0.00%	3.093	3.093	0.00%	4.424	4.424	0.00%
2002	0.576	0.576	0.00%	3.122	3.122	0.00%	4.494	4.494	0.00%
2003	0.586	0.586	0.00%	3.154	3.154	0.00%	4.564	4.564	0.00%
2004	0.596	0.596	0.00%	3.186	3.186	0.00%	4.631	4.631	0.00%
2005	0.606	0.606	0.00%	3.221	3.221	0.00%	4.696	4.696	0.00%
2006	0.616	0.615	-0.17%	3.245	3.244	-0.02%	4.762	4.754	-0.17%
2007	0.627	0.624	-0.47%	3.258	3.239	-0.58%	4.830	4.807	-0.48%
2008	0.637	0.632	-0.74%	3.270	3.220	-1.51%	4.896	4.860	-0.74%
2009	0.647	0.641	-0.98%	3.282	3.219	-1.92%	4.959	4.911	-0.98%
2010	0.657	0.649	-1.22%	3.294	3.218	-2.31%	5.020	4.959	-1.22%
2011	0.666	0.657	-1.46%	3.315	3.228	-2.62%	5.079	5.005	-1.46%
2012	0.676	0.664	-1.71%	3.334	3.237	-2.92%	5.135	5.047	-1.71%
2013	0.685	0.671	-1.95%	3.353	3.246	-3.19%	5.188	5.086	-1.95%
2014	0.694	0.678	-2.19%	3.371	3.256	-3.42%	5.238	5.124	-2.18%
2015	0.702	0.685	-2.40%	3.389	3.266	-3.63%	5.284	5.156	-2.41%
2016	0.710	0.692	-2.63%	3.405	3.276	-3.80%	5.329	5.188	-2.63%
2017	0.719	0.698	-2.84%	3.421	3.285	-3.97%	5.373	5.220	-2.85%
2018	0.727	0.705	-3.05%	3.437	3.295	-4.13%	5.414	5.249	-3.05%
2019	0.736	0.712	-3.26%	3.451	3.304	-4.26%	5.455	5.277	-3.25%
2020	0.744	0.718	-3.44%	3.465	3.313	-4.39%	5.493	5.304	-3.44%
2021	0.752	0.725	-3.61%	3.482	3.326	-4.49%	5.529	5.330	-3.61%
2022	0.760	0.732	-3.75%	3.495	3.336	-4.55%	5.562	5.353	-3.75%
2023	0.768	0.738	-3.89%	3.508	3.347	-4.58%	5.594	5.376	-3.89%
2024	0.776	0.745	-4.00%	3.521	3.359	-4.61%	5.625	5.399	-4.00%
2025	0.785	0.752	-4.10%	3.534	3.370	-4.62%	5.654	5.423	-4.10%
2026	0.793	0.760	-4.17%	3.546	3.382	-4.62%	5.685	5.447	-4.18%
2027	0.802	0.768	-4.26%	3.557	3.393	-4.60%	5.716	5.473	-4.26%
2028	0.811	0.776	-4.31%	3.568	3.404	-4.60%	5.746	5.498	-4.32%
2029	0.820	0.784	-4.38%	3.578	3.414	-4.59%	5.776	5.523	-4.37%
2030	0.829	0.793	-4.39%	3.588	3.424	-4.57%	5.805	5.550	-4.39%
2031	0.839	0.802	-4.37%	3.597	3.436	-4.48%	5.836	5.580	-4.37%
2032	0.849	0.812	-4.34%	3.607	3.451	-4.30%	5.867	5.612	-4.34%
2033	0.859	0.822	-4.32%	3.616	3.465	-4.17%	5.898	5.644	-4.31%
2034	0.869	0.832	-4.27%	3.624	3.477	-4.07%	5.930	5.676	-4.28%
2035	0.880	0.843	-4.22%	3.633	3.489	-3.98%	5.962	5.710	-4.23%

Table 4.4 (continued)
Impact of Water Shortage on Lincoln County, Nevada

Year	Personal Disposable Income			Gross Regional Product			Per Capita Income		
	Billions of 1990 Dollars			Billions of 1990 Dollars			1990 Dollars		
	Control	Water Shortage	Percent Difference	Control	Water Shortage	Percent Difference	Control	Water Shortage	Percent Difference
1990	\$0.049	\$0.049	0.00%	\$0.081	\$0.081	0.00%	\$13,574	\$13,574	0.00%
1991	\$0.051	\$0.051	0.00%	\$0.082	\$0.082	0.00%	\$13,848	\$13,848	0.00%
1992	\$0.052	\$0.052	0.00%	\$0.083	\$0.083	0.00%	\$13,975	\$13,975	0.00%
1993	\$0.054	\$0.054	0.00%	\$0.085	\$0.085	0.00%	\$14,124	\$14,124	0.00%
1994	\$0.057	\$0.057	0.00%	\$0.093	\$0.093	0.00%	\$14,690	\$14,690	0.00%
1995	\$0.060	\$0.060	0.00%	\$0.102	\$0.102	0.00%	\$15,082	\$15,082	0.00%
1996	\$0.062	\$0.062	0.00%	\$0.108	\$0.108	0.00%	\$15,445	\$15,445	0.00%
1997	\$0.063	\$0.063	0.00%	\$0.110	\$0.110	0.00%	\$15,404	\$15,404	0.00%
1998	\$0.065	\$0.065	0.00%	\$0.113	\$0.113	0.00%	\$15,672	\$15,672	0.00%
1999	\$0.069	\$0.069	0.00%	\$0.122	\$0.122	0.00%	\$16,279	\$16,279	0.00%
2000	\$0.071	\$0.071	0.00%	\$0.131	\$0.131	0.00%	\$16,451	\$16,451	0.00%
2001	\$0.074	\$0.074	0.00%	\$0.133	\$0.133	0.00%	\$16,653	\$16,653	0.00%
2002	\$0.076	\$0.076	0.00%	\$0.136	\$0.136	0.00%	\$16,863	\$16,863	0.00%
2003	\$0.078	\$0.078	0.00%	\$0.140	\$0.140	0.00%	\$17,161	\$17,161	0.00%
2004	\$0.081	\$0.081	0.00%	\$0.143	\$0.143	0.00%	\$17,417	\$17,417	0.00%
2005	\$0.083	\$0.083	0.00%	\$0.147	\$0.147	0.00%	\$17,762	\$17,762	0.00%
2006	\$0.086	\$0.085	-0.67%	\$0.151	\$0.150	-0.66%	\$18,003	\$17,913	-0.50%
2007	\$0.088	\$0.087	-1.30%	\$0.154	\$0.151	-1.58%	\$18,189	\$18,039	-0.82%
2008	\$0.090	\$0.088	-1.84%	\$0.156	\$0.153	-2.20%	\$18,334	\$18,130	-1.11%
2009	\$0.092	\$0.090	-2.08%	\$0.159	\$0.155	-2.47%	\$18,483	\$18,278	-1.11%
2010	\$0.094	\$0.091	-2.59%	\$0.162	\$0.157	-2.99%	\$18,639	\$18,381	-1.38%
2011	\$0.096	\$0.093	-2.51%	\$0.165	\$0.160	-2.93%	\$18,840	\$18,639	-1.07%
2012	\$0.098	\$0.095	-2.97%	\$0.168	\$0.162	-3.43%	\$19,005	\$18,761	-1.29%
2013	\$0.100	\$0.097	-3.15%	\$0.171	\$0.165	-3.56%	\$19,220	\$18,985	-1.22%
2014	\$0.102	\$0.098	-3.55%	\$0.174	\$0.167	-3.98%	\$19,397	\$19,125	-1.40%
2015	\$0.104	\$0.100	-3.70%	\$0.177	\$0.170	-4.13%	\$19,592	\$19,331	-1.33%
2016	\$0.105	\$0.101	-3.86%	\$0.180	\$0.173	-4.33%	\$19,784	\$19,535	-1.26%
2017	\$0.108	\$0.103	-3.77%	\$0.184	\$0.176	-4.20%	\$20,016	\$19,826	-0.95%
2018	\$0.109	\$0.105	-3.93%	\$0.186	\$0.178	-4.33%	\$20,214	\$20,032	-0.90%
2019	\$0.112	\$0.107	-4.07%	\$0.190	\$0.181	-4.51%	\$20,453	\$20,280	-0.84%
2020	\$0.113	\$0.109	-4.20%	\$0.192	\$0.184	-4.58%	\$20,657	\$20,493	-0.79%
2021	\$0.116	\$0.111	-4.34%	\$0.196	\$0.186	-4.72%	\$20,905	\$20,746	-0.76%
2022	\$0.118	\$0.112	-4.46%	\$0.199	\$0.189	-4.78%	\$21,160	\$21,005	-0.73%
2023	\$0.120	\$0.114	-4.37%	\$0.201	\$0.192	-4.69%	\$21,382	\$21,274	-0.51%
2024	\$0.122	\$0.116	-4.50%	\$0.204	\$0.195	-4.77%	\$21,641	\$21,529	-0.52%
2025	\$0.124	\$0.118	-4.42%	\$0.207	\$0.197	-4.67%	\$21,901	\$21,828	-0.33%
2026	\$0.126	\$0.120	-4.53%	\$0.210	\$0.200	-4.75%	\$22,194	\$22,113	-0.36%
2027	\$0.128	\$0.123	-4.45%	\$0.213	\$0.203	-4.65%	\$22,444	\$22,398	-0.20%
2028	\$0.131	\$0.125	-4.36%	\$0.216	\$0.206	-4.52%	\$22,731	\$22,721	-0.05%
2029	\$0.133	\$0.127	-4.29%	\$0.219	\$0.209	-4.43%	\$23,018	\$23,036	0.08%
2030	\$0.135	\$0.130	-4.21%	\$0.222	\$0.212	-4.31%	\$23,301	\$23,344	0.19%
2031	\$0.138	\$0.132	-4.32%	\$0.225	\$0.215	-4.33%	\$23,616	\$23,629	0.06%
2032	\$0.140	\$0.134	-4.07%	\$0.227	\$0.218	-4.02%	\$23,887	\$23,955	0.28%
2033	\$0.143	\$0.137	-4.00%	\$0.230	\$0.221	-3.91%	\$24,226	\$24,306	0.33%
2034	\$0.145	\$0.140	-3.93%	\$0.233	\$0.224	-3.80%	\$24,524	\$24,613	0.36%
2035	\$0.148	\$0.142	-3.86%	\$0.236	\$0.227	-3.70%	\$24,854	\$24,952	0.39%

Table 4.5
Impact of Clark County Water Shortage on Rural Nevada

Year	Thousands of People								
	Govt Employment			Total Employment			Population		
	Control	Water Shortage	Percent Difference	Control	Water Shortage	Percent Difference	Control	Water Shortage	Percent Difference
1990	8.815	8.815	0.00%	92.389	92.389	0.00%	148.631	148.631	0.00%
1991	9.003	9.003	0.00%	93.836	93.836	0.00%	152.515	152.515	0.00%
1992	9.206	9.206	0.00%	95.288	95.288	0.00%	156.229	156.229	0.00%
1993	9.484	9.484	0.00%	96.445	96.445	0.00%	160.864	160.864	0.00%
1994	9.732	9.732	0.00%	98.997	98.997	0.00%	165.251	165.251	0.00%
1995	9.873	9.873	0.00%	101.877	101.877	0.00%	168.250	168.250	0.00%
1996	10.004	10.004	0.00%	104.273	104.273	0.00%	170.737	170.737	0.00%
1997	10.239	10.239	0.00%	105.963	105.963	0.00%	173.736	173.736	0.00%
1998	10.487	10.487	0.00%	106.885	106.885	0.00%	177.205	177.205	0.00%
1999	10.690	10.690	0.00%	108.779	108.779	0.00%	179.810	179.810	0.00%
2000	10.891	10.891	0.00%	112.894	112.894	0.00%	182.698	182.698	0.00%
2001	11.125	11.125	0.00%	114.287	114.287	0.00%	186.253	186.253	0.00%
2002	11.339	11.339	0.00%	115.839	115.839	0.00%	189.444	189.444	0.00%
2003	11.558	11.558	0.00%	117.477	117.477	0.00%	192.695	192.695	0.00%
2004	11.774	11.774	0.00%	119.164	119.164	0.00%	195.881	195.881	0.00%
2005	11.992	11.992	0.00%	120.933	120.933	0.00%	199.067	199.067	0.00%
2006	12.215	12.210	-0.04%	122.317	122.310	-0.01%	202.314	202.311	-0.00%
2007	12.445	12.426	-0.15%	123.193	123.108	-0.07%	205.630	205.548	-0.04%
2008	12.675	12.643	-0.25%	124.003	123.422	-0.47%	208.939	208.634	-0.15%
2009	12.907	12.865	-0.33%	124.818	124.061	-0.61%	212.246	211.729	-0.24%
2010	13.140	13.085	-0.42%	125.648	124.680	-0.77%	215.527	214.834	-0.32%
2011	13.373	13.305	-0.51%	126.795	125.671	-0.89%	218.778	217.884	-0.41%
2012	13.604	13.523	-0.60%	127.919	126.642	-1.00%	221.965	220.873	-0.49%
2013	13.833	13.739	-0.68%	129.023	127.599	-1.10%	225.073	223.771	-0.58%
2014	14.062	13.954	-0.77%	130.115	128.561	-1.19%	228.126	226.609	-0.66%
2015	14.279	14.158	-0.85%	131.167	129.501	-1.27%	230.934	229.205	-0.75%
2016	14.496	14.361	-0.93%	132.177	130.421	-1.33%	233.676	231.740	-0.83%
2017	14.711	14.563	-1.01%	133.174	131.328	-1.39%	236.332	234.189	-0.91%
2018	14.925	14.764	-1.08%	134.159	132.224	-1.44%	238.900	236.549	-0.98%
2019	15.140	14.965	-1.15%	135.127	133.117	-1.49%	241.398	238.843	-1.06%
2020	15.353	15.166	-1.22%	136.068	133.992	-1.53%	243.811	241.061	-1.13%
2021	15.565	15.366	-1.28%	137.268	135.134	-1.55%	246.136	243.200	-1.19%
2022	15.776	15.567	-1.33%	138.357	136.182	-1.57%	248.355	245.249	-1.25%
2023	15.986	15.767	-1.37%	139.431	137.234	-1.58%	250.479	247.220	-1.30%
2024	16.197	15.968	-1.41%	140.478	138.267	-1.57%	252.537	249.141	-1.34%
2025	16.407	16.170	-1.44%	141.497	139.274	-1.57%	254.507	250.986	-1.38%
2026	16.621	16.377	-1.47%	142.484	140.279	-1.55%	256.441	252.817	-1.41%
2027	16.838	16.587	-1.49%	143.440	141.245	-1.53%	258.366	254.653	-1.44%
2028	17.057	16.799	-1.51%	144.386	142.187	-1.52%	260.238	256.436	-1.46%
2029	17.278	17.013	-1.53%	145.290	143.082	-1.52%	262.063	258.175	-1.48%
2030	17.501	17.231	-1.54%	146.173	143.960	-1.51%	263.845	259.880	-1.50%
2031	17.730	17.458	-1.53%	147.032	144.846	-1.49%	265.642	261.625	-1.51%
2032	17.965	17.691	-1.52%	147.876	145.779	-1.42%	267.464	263.432	-1.51%
2033	18.203	17.927	-1.52%	148.701	146.664	-1.37%	269.264	265.228	-1.50%
2034	18.445	18.167	-1.51%	149.496	147.506	-1.33%	271.037	266.994	-1.49%
2035	18.688	18.409	-1.49%	150.275	148.321	-1.30%	272.768	268.723	-1.48%

Table 4.5 (continued)
Impact of Clark County Water Shortage on Rural Nevada

Year	Personal Disposable Income Billions of 1990 Dollars			Gross Regional Product Billions of 1990 Dollars			Per Capita Income 1990 Dollars		
	Control	Water Shortage	Percent Difference	Control	Water Shortage	Percent Difference	Control	Water Shortage	Percent Difference
1990	\$2.128	\$2.128	0.00%	\$3.875	\$3.875	0.00%	\$14,321	\$14,321	0.00%
1991	\$2.217	\$2.217	0.00%	\$3.968	\$3.968	0.00%	\$14,534	\$14,534	0.00%
1992	\$2.298	\$2.298	0.00%	\$4.036	\$4.036	0.00%	\$14,709	\$14,709	0.00%
1993	\$2.392	\$2.392	0.00%	\$4.135	\$4.135	0.00%	\$14,873	\$14,873	0.00%
1994	\$2.506	\$2.506	0.00%	\$4.339	\$4.339	0.00%	\$15,166	\$15,166	0.00%
1995	\$2.577	\$2.577	0.00%	\$4.526	\$4.526	0.00%	\$15,317	\$15,317	0.00%
1996	\$2.640	\$2.640	0.00%	\$4.639	\$4.639	0.00%	\$15,461	\$15,461	0.00%
1997	\$2.680	\$2.680	0.00%	\$4.748	\$4.748	0.00%	\$15,423	\$15,423	0.00%
1998	\$2.772	\$2.772	0.00%	\$4.847	\$4.847	0.00%	\$15,644	\$15,644	0.00%
1999	\$2.874	\$2.874	0.00%	\$5.006	\$5.006	0.00%	\$15,986	\$15,986	0.00%
2000	\$2.935	\$2.935	0.00%	\$5.393	\$5.393	0.00%	\$16,065	\$16,065	0.00%
2001	\$3.031	\$3.031	0.00%	\$5.514	\$5.514	0.00%	\$16,274	\$16,274	0.00%
2002	\$3.131	\$3.131	0.00%	\$5.653	\$5.653	0.00%	\$16,527	\$16,527	0.00%
2003	\$3.237	\$3.237	0.00%	\$5.804	\$5.804	0.00%	\$16,800	\$16,800	0.00%
2004	\$3.351	\$3.351	0.00%	\$5.963	\$5.963	0.00%	\$17,105	\$17,105	0.00%
2005	\$3.467	\$3.467	0.00%	\$6.132	\$6.132	0.00%	\$17,418	\$17,418	0.00%
2006	\$3.578	\$3.573	-0.12%	\$6.281	\$6.170	-0.02%	\$17,685	\$17,663	-0.12%
2007	\$3.679	\$3.665	-0.38%	\$6.406	\$6.287	-0.53%	\$17,891	\$17,830	-0.34%
2008	\$3.779	\$3.759	-0.52%	\$6.529	\$6.402	-0.72%	\$18,086	\$18,018	-0.37%
2009	\$3.879	\$3.854	-0.66%	\$6.653	\$6.520	-0.94%	\$18,278	\$18,203	-0.41%
2010	\$3.981	\$3.951	-0.78%	\$6.781	\$6.641	-1.10%	\$18,473	\$18,389	-0.46%
2011	\$4.086	\$4.050	-0.89%	\$6.925	\$6.779	-1.26%	\$18,678	\$18,588	-0.48%
2012	\$4.192	\$4.150	-0.99%	\$7.068	\$6.917	-1.42%	\$18,884	\$18,788	-0.51%
2013	\$4.297	\$4.250	-1.09%	\$7.210	\$7.055	-1.55%	\$19,091	\$18,992	-0.52%
2014	\$4.404	\$4.352	-1.18%	\$7.353	\$7.194	-1.67%	\$19,303	\$19,203	-0.52%
2015	\$4.509	\$4.452	-1.25%	\$7.494	\$7.333	-1.76%	\$19,524	\$19,424	-0.51%
2016	\$4.615	\$4.554	-1.32%	\$7.634	\$7.472	-1.85%	\$19,748	\$19,650	-0.49%
2017	\$4.722	\$4.657	-1.39%	\$7.775	\$7.613	-1.94%	\$19,981	\$19,884	-0.48%
2018	\$4.830	\$4.761	-1.44%	\$7.917	\$7.752	-2.01%	\$20,219	\$20,126	-0.46%
2019	\$4.940	\$4.867	-1.49%	\$8.060	\$7.893	-2.07%	\$20,466	\$20,377	-0.43%
2020	\$5.051	\$4.974	-1.53%	\$8.202	\$8.034	-2.11%	\$20,718	\$20,634	-0.41%
2021	\$5.165	\$5.084	-1.56%	\$8.358	\$8.190	-2.15%	\$20,983	\$20,906	-0.37%
2022	\$5.278	\$5.194	-1.58%	\$8.506	\$8.344	-2.16%	\$21,250	\$21,180	-0.33%
2023	\$5.391	\$5.305	-1.59%	\$8.653	\$8.495	-2.16%	\$21,522	\$21,460	-0.29%
2024	\$5.506	\$5.418	-1.59%	\$8.800	\$8.644	-2.15%	\$21,801	\$21,746	-0.25%
2025	\$5.621	\$5.532	-1.58%	\$8.946	\$8.792	-2.12%	\$22,086	\$22,041	-0.20%
2026	\$5.739	\$5.648	-1.58%	\$9.091	\$8.940	-2.09%	\$22,379	\$22,342	-0.17%
2027	\$5.858	\$5.766	-1.57%	\$9.235	\$9.087	-2.08%	\$22,674	\$22,643	-0.14%
2028	\$5.980	\$5.886	-1.57%	\$9.380	\$9.234	-2.06%	\$22,979	\$22,954	-0.11%
2029	\$6.104	\$6.008	-1.56%	\$9.524	\$9.380	-2.05%	\$23,290	\$23,272	-0.08%
2030	\$6.229	\$6.133	-1.54%	\$9.669	\$9.527	-2.00%	\$23,608	\$23,600	-0.04%
2031	\$6.358	\$6.262	-1.50%	\$9.814	\$9.673	-1.91%	\$23,933	\$23,937	0.01%
2032	\$6.489	\$6.395	-1.46%	\$9.960	\$9.820	-1.83%	\$24,263	\$24,274	0.05%
2033	\$6.624	\$6.530	-1.43%	\$10.107	\$9.969	-1.77%	\$24,601	\$24,619	0.07%
2034	\$6.762	\$6.667	-1.40%	\$10.254	\$10.117	-1.72%	\$24,947	\$24,970	0.09%
2035	\$6.901	\$6.805	-1.39%	\$10.403	\$10.266	-1.66%	\$25,301	\$25,325	0.09%

Table 4.7
Impact of Clark County Water Shortage on the State of Nevada

Year	Government Employment			Total Employment			Population		
	Thousands of People			Thousands of People			Thousands of People		
	Control	Water Shortage	Percent Difference	Control	Water Shortage	Percent Difference	Control	Water Shortage	Percent Difference
1990	83.569	83.569	0.00%	766.579	766.579	0.00%	1294.720	1294.720	0.00%
1991	86.295	86.295	0.00%	791.794	791.794	0.00%	1344.300	1344.300	0.00%
1992	89.086	89.086	0.00%	813.319	813.319	0.00%	1393.350	1393.350	0.00%
1993	92.639	92.639	0.00%	835.275	835.275	0.00%	1444.992	1444.992	0.00%
1994	95.772	95.772	0.00%	858.763	858.763	0.00%	1495.212	1495.212	0.00%
1995	98.104	98.104	0.00%	899.499	899.499	0.00%	1542.486	1542.486	0.00%
1996	100.748	100.748	0.00%	943.231	943.231	0.00%	1590.134	1590.134	0.00%
1997	104.383	104.383	0.00%	973.230	973.230	0.00%	1638.938	1638.938	0.00%
1998	108.059	108.059	0.00%	994.460	994.460	0.00%	1688.464	1688.464	0.00%
1999	111.443	111.443	0.00%	1026.404	1026.404	0.00%	1734.856	1734.856	0.00%
2000	114.150	114.150	0.00%	1057.155	1057.155	0.00%	1780.389	1780.389	0.00%
2001	117.144	117.144	0.00%	1082.456	1082.456	0.00%	1818.918	1818.918	0.00%
2002	120.334	120.334	0.00%	1109.072	1109.072	0.00%	1857.347	1857.347	0.00%
2003	123.444	123.444	0.00%	1134.978	1134.978	0.00%	1895.839	1895.839	0.00%
2004	126.503	126.503	0.00%	1161.900	1161.900	0.00%	1934.209	1934.209	0.00%
2005	129.609	129.609	0.00%	1190.059	1190.059	0.00%	1972.661	1972.661	0.00%
2006	132.897	128.034	-3.66%	1217.034	1133.868	-6.83%	2011.515	1937.020	-3.70%
2007	136.385	127.299	-6.66%	1239.596	1147.407	-7.44%	2050.781	1912.894	-6.72%
2008	139.925	129.550	-7.41%	1259.776	1156.185	-8.22%	2090.112	1934.036	-7.47%
2009	143.527	131.539	-8.35%	1280.150	1165.680	-8.94%	2129.591	1950.783	-8.40%
2010	147.199	133.619	-9.23%	1300.607	1176.510	-9.54%	2169.137	1968.410	-9.25%
2011	150.469	135.363	-10.04%	1323.077	1189.667	-10.08%	2205.336	1983.534	-10.06%
2012	153.724	137.109	-10.81%	1343.725	1203.034	-10.47%	2241.372	1998.951	-10.82%
2013	156.978	138.894	-11.52%	1364.255	1216.410	-10.84%	2277.222	2014.978	-11.52%
2014	160.271	141.284	-11.85%	1384.740	1231.546	-11.06%	2312.998	2039.339	-11.83%
2015	163.427	143.504	-12.19%	1403.017	1243.690	-11.36%	2347.966	2062.261	-12.17%
2016	166.533	145.634	-12.55%	1419.193	1253.406	-11.68%	2382.761	2084.350	-12.52%
2017	169.654	147.807	-12.88%	1437.385	1266.055	-11.92%	2417.264	2106.679	-12.85%
2018	172.813	150.089	-13.15%	1455.398	1278.452	-12.16%	2451.452	2129.897	-13.12%
2019	175.957	152.471	-13.35%	1471.696	1289.405	-12.39%	2485.408	2154.477	-13.31%
2020	179.057	155.149	-13.35%	1486.243	1300.043	-12.53%	2519.061	2183.465	-13.32%
2021	180.677	156.769	-13.23%	1492.355	1305.088	-12.55%	2552.169	2213.633	-13.26%
2022	182.154	158.348	-13.07%	1502.719	1313.283	-12.61%	2584.879	2244.482	-13.17%
2023	184.916	160.968	-12.95%	1516.260	1323.559	-12.71%	2616.435	2274.610	-13.06%
2024	187.746	163.628	-12.85%	1531.220	1335.856	-12.76%	2649.196	2305.424	-12.98%
2025	190.555	166.279	-12.74%	1544.373	1347.956	-12.72%	2680.849	2335.387	-12.89%
2026	193.410	168.956	-12.64%	1558.940	1359.135	-12.82%	2712.347	2364.977	-12.81%
2027	196.323	171.612	-12.59%	1573.155	1369.875	-12.92%	2743.812	2393.567	-12.76%
2028	199.249	174.310	-12.52%	1585.696	1380.424	-12.95%	2775.100	2422.364	-12.71%
2029	202.206	177.064	-12.43%	1599.343	1393.252	-12.89%	2806.196	2451.377	-12.64%
2030	205.185	181.344	-11.62%	1611.082	1414.783	-12.18%	2837.101	2501.410	-11.83%
2031	208.236	185.846	-10.75%	1624.094	1433.112	-11.76%	2864.558	2550.674	-10.96%
2032	211.394	189.245	-10.48%	1636.829	1448.356	-11.51%	2892.648	2583.552	-10.69%
2033	214.603	192.623	-10.24%	1647.765	1460.580	-11.36%	2920.587	2615.331	-10.45%
2034	217.946	196.132	-10.01%	1659.991	1475.040	-11.14%	2949.505	2648.049	-10.22%
2035	221.427	199.763	-9.78%	1671.927	1487.844	-11.01%	2979.488	2681.610	-10.00%

Table 4.6 (continued)
Impact of Clark County Water Shortage on Washoe County and Carson City

Year	Disposable Personal Income			Gross Regional Product			Per Capita Income		
	Billions of 1990 Dollars			Billions of 1990 Dollars			1990 Dollars		
	Control	Water Shortage	Percent Difference	Control	Water Shortage	Percent Difference	Control	Water Shortage	Percent Difference
1990	\$5.399	\$5.399	0.00%	\$9.313	\$9.313	0.00%	\$17,699	\$17,699	0.00%
1991	\$5.695	\$5.695	0.00%	\$9.687	\$9.687	0.00%	\$17,972	\$17,972	0.00%
1992	\$5.966	\$5.966	0.00%	\$9.951	\$9.951	0.00%	\$18,171	\$18,171	0.00%
1993	\$6.274	\$6.274	0.00%	\$10.243	\$10.243	0.00%	\$18,374	\$18,374	0.00%
1994	\$6.573	\$6.573	0.00%	\$10.632	\$10.632	0.00%	\$18,606	\$18,606	0.00%
1995	\$6.840	\$6.840	0.00%	\$11.370	\$11.370	0.00%	\$18,815	\$18,815	0.00%
1996	\$7.141	\$7.141	0.00%	\$12.007	\$12.007	0.00%	\$19,050	\$19,050	0.00%
1997	\$7.355	\$7.355	0.00%	\$12.492	\$12.492	0.00%	\$19,017	\$19,017	0.00%
1998	\$7.715	\$7.715	0.00%	\$12.909	\$12.909	0.00%	\$19,338	\$19,338	0.00%
1999	\$8.053	\$8.053	0.00%	\$13.441	\$13.441	0.00%	\$19,697	\$19,697	0.00%
2000	\$8.155	\$8.155	0.00%	\$14.044	\$14.044	0.00%	\$19,540	\$19,540	0.00%
2001	\$8.454	\$8.454	0.00%	\$14.420	\$14.420	0.00%	\$19,790	\$19,790	0.00%
2002	\$8.777	\$8.777	0.00%	\$14.844	\$14.844	0.00%	\$20,067	\$20,067	0.00%
2003	\$9.119	\$9.119	0.00%	\$15.303	\$15.303	0.00%	\$20,373	\$20,373	0.00%
2004	\$9.484	\$9.484	0.00%	\$15.794	\$15.794	0.00%	\$20,719	\$20,719	0.00%
2005	\$9.863	\$9.863	0.00%	\$16.314	\$16.314	0.00%	\$21,074	\$21,074	0.00%
2006	\$10.235	\$10.249	0.14%	\$16.812	\$16.865	0.32%	\$21,386	\$21,405	0.09%
2007	\$10.587	\$10.584	-0.02%	\$17.243	\$17.231	-0.07%	\$21,627	\$21,618	-0.05%
2008	\$10.939	\$10.927	-0.11%	\$17.671	\$17.640	-0.17%	\$21,856	\$21,845	-0.05%
2009	\$11.298	\$11.279	-0.17%	\$18.108	\$18.057	-0.28%	\$22,082	\$22,067	-0.07%
2010	\$11.665	\$11.638	-0.23%	\$18.553	\$18.486	-0.36%	\$22,307	\$22,290	-0.08%
2011	\$12.044	\$12.009	-0.29%	\$19.046	\$18.961	-0.44%	\$22,544	\$22,524	-0.09%
2012	\$12.425	\$12.381	-0.35%	\$19.534	\$19.430	-0.53%	\$22,779	\$22,757	-0.10%
2013	\$12.810	\$12.759	-0.40%	\$20.020	\$19.902	-0.59%	\$23,017	\$22,995	-0.10%
2014	\$13.203	\$13.143	-0.45%	\$20.510	\$20.376	-0.65%	\$23,257	\$23,235	-0.10%
2015	\$13.594	\$13.527	-0.49%	\$20.994	\$20.849	-0.69%	\$23,507	\$23,486	-0.09%
2016	\$13.991	\$13.917	-0.53%	\$21.477	\$21.321	-0.73%	\$23,761	\$23,742	-0.08%
2017	\$14.392	\$14.311	-0.56%	\$21.959	\$21.790	-0.77%	\$24,021	\$24,004	-0.07%
2018	\$14.799	\$14.711	-0.60%	\$22.442	\$22.262	-0.80%	\$24,290	\$24,274	-0.07%
2019	\$15.213	\$15.118	-0.62%	\$22.927	\$22.739	-0.82%	\$24,566	\$24,553	-0.05%
2020	\$15.632	\$15.531	-0.65%	\$23.412	\$23.215	-0.84%	\$24,851	\$24,840	-0.04%
2021	\$16.062	\$15.955	-0.66%	\$23.947	\$23.745	-0.84%	\$25,149	\$25,141	-0.03%
2022	\$16.491	\$16.379	-0.68%	\$24.457	\$24.252	-0.84%	\$25,448	\$25,443	-0.02%
2023	\$16.922	\$16.807	-0.68%	\$24.962	\$24.754	-0.83%	\$25,754	\$25,753	-0.00%
2024	\$17.358	\$17.239	-0.69%	\$25.462	\$25.251	-0.83%	\$26,066	\$26,068	0.01%
2025	\$17.799	\$17.676	-0.69%	\$25.958	\$25.747	-0.81%	\$26,386	\$26,391	0.02%
2026	\$18.247	\$18.122	-0.69%	\$26.452	\$26.242	-0.79%	\$26,715	\$26,723	0.03%
2027	\$18.703	\$18.575	-0.69%	\$26.943	\$26.733	-0.78%	\$27,046	\$27,057	0.04%
2028	\$19.170	\$19.038	-0.69%	\$27.439	\$27.226	-0.78%	\$27,389	\$27,401	0.04%
2029	\$19.643	\$19.508	-0.69%	\$27.930	\$27.714	-0.77%	\$27,739	\$27,753	0.05%
2030	\$20.124	\$19.984	-0.70%	\$28.420	\$28.197	-0.79%	\$28,097	\$28,112	0.05%
2031	\$20.619	\$20.477	-0.69%	\$28.913	\$28.697	-0.75%	\$28,463	\$28,481	0.06%
2032	\$21.127	\$20.985	-0.67%	\$29.410	\$29.199	-0.72%	\$28,835	\$28,855	0.07%
2033	\$21.648	\$21.504	-0.66%	\$29.908	\$29.702	-0.69%	\$29,216	\$29,237	0.07%
2034	\$22.179	\$22.034	-0.66%	\$30.405	\$30.200	-0.67%	\$29,605	\$29,627	0.08%
2035	\$22.720	\$22.574	-0.64%	\$30.901	\$30.701	-0.65%	\$30,002	\$30,027	0.08%

Table 4.6
Impact of Clark County Water Shortage on Washoe County and Carson City

Year	Government Employment			Total Employment			Population		
	Thousands of People			Thousands of People			Thousands of People		
	Control	Water Shortage	Percent Difference	Control	Water Shortage	Percent Difference	Control	Water Shortage	Percent Difference
1990	21.168	21.168	0.00%	207.890	207.890	0.00%	305.028	305.028	0.00%
1991	21.894	21.894	0.00%	213.359	213.359	0.00%	316.861	316.861	0.00%
1992	22.660	22.660	0.00%	218.358	218.358	0.00%	328.347	328.347	0.00%
1993	23.585	23.585	0.00%	221.743	221.743	0.00%	341.437	341.437	0.00%
1994	24.384	24.384	0.00%	226.501	226.501	0.00%	353.252	353.252	0.00%
1995	25.011	25.011	0.00%	236.614	236.614	0.00%	363.547	363.547	0.00%
1996	25.754	25.754	0.00%	246.490	246.490	0.00%	374.831	374.831	0.00%
1997	26.735	26.735	0.00%	253.520	253.520	0.00%	386.778	386.778	0.00%
1998	27.701	27.701	0.00%	257.475	257.475	0.00%	398.960	398.960	0.00%
1999	28.522	28.522	0.00%	262.292	262.292	0.00%	408.825	408.825	0.00%
2000	29.203	29.203	0.00%	269.705	269.705	0.00%	417.366	417.366	0.00%
2001	29.957	29.957	0.00%	273.887	273.887	0.00%	427.187	427.187	0.00%
2002	30.744	30.744	0.00%	278.542	278.542	0.00%	437.395	437.395	0.00%
2003	31.537	31.537	0.00%	283.497	283.497	0.00%	447.598	447.598	0.00%
2004	32.333	32.333	0.00%	288.670	288.670	0.00%	457.759	457.759	0.00%
2005	33.139	33.139	0.00%	294.121	294.121	0.00%	468.004	468.004	0.00%
2006	33.974	33.992	0.05%	299.030	299.022	-0.00%	478.588	478.839	0.05%
2007	34.840	34.848	0.02%	302.657	303.369	0.24%	489.509	489.617	0.02%
2008	35.718	35.694	-0.07%	306.132	305.800	-0.11%	500.510	500.183	-0.07%
2009	36.613	36.575	-0.10%	309.653	309.035	-0.20%	511.668	511.133	-0.10%
2010	37.523	37.465	-0.15%	312.229	312.322	-0.29%	522.928	522.122	-0.15%
2011	38.443	38.365	-0.20%	317.594	316.447	-0.36%	534.224	533.142	-0.20%
2012	39.366	39.265	-0.25%	321.865	320.481	-0.43%	545.440	544.052	-0.25%
2013	40.291	40.168	-0.31%	326.082	324.456	-0.50%	556.568	554.861	-0.31%
2014	41.228	41.081	-0.36%	330.280	328.447	-0.55%	567.693	565.670	-0.36%
2015	42.138	41.968	-0.40%	334.317	332.308	-0.60%	578.302	575.977	-0.40%
2016	43.054	42.862	-0.44%	338.286	336.158	-0.63%	588.821	586.200	-0.45%
2017	43.970	43.755	-0.49%	342.171	339.917	-0.66%	599.154	596.224	-0.49%
2018	44.885	44.646	-0.53%	345.999	343.602	-0.69%	609.281	606.044	-0.53%
2019	45.805	45.544	-0.57%	349.789	347.281	-0.72%	619.263	615.736	-0.57%
2020	46.726	46.444	-0.60%	353.508	350.908	-0.74%	629.050	625.247	-0.60%
2021	47.652	47.349	-0.63%	357.999	355.324	-0.75%	638.666	634.616	-0.63%
2022	48.575	48.255	-0.66%	362.203	359.496	-0.75%	648.016	643.747	-0.66%
2023	49.494	49.158	-0.68%	366.319	363.583	-0.75%	657.074	652.611	-0.68%
2024	50.416	50.065	-0.70%	370.342	367.598	-0.74%	665.937	661.299	-0.70%
2025	51.337	50.973	-0.71%	374.284	371.523	-0.74%	674.540	669.753	-0.71%
2026	52.272	51.897	-0.72%	378.164	375.419	-0.73%	683.040	678.135	-0.72%
2027	53.218	52.832	-0.73%	381.965	379.252	-0.71%	691.522	686.508	-0.73%
2028	54.177	53.780	-0.73%	385.770	383.060	-0.70%	699.897	694.766	-0.73%
2029	55.145	54.736	-0.74%	389.462	386.730	-0.70%	708.142	702.895	-0.74%
2030	56.120	55.699	-0.75%	393.101	390.339	-0.70%	716.251	710.879	-0.75%
2031	57.119	56.691	-0.75%	396.702	393.874	-0.71%	724.424	718.991	-0.75%
2032	58.145	57.713	-0.74%	400.294	397.569	-0.68%	732.706	727.262	-0.74%
2033	59.187	58.751	-0.74%	403.846	401.187	-0.66%	740.967	735.503	-0.74%
2034	60.245	59.804	-0.73%	407.312	404.708	-0.64%	749.177	743.694	-0.73%
2035	61.312	60.867	-0.73%	410.713	408.134	-0.63%	757.276	751.783	-0.73%

Table 4.7 (continued)
Impact of Clark County Water Shortage on the State of Nevada

Year	Personal Disposable Income			Gross Regional Product			Per Capita Income		
	Billions of 1990 Dollars			Billions of 1990 Dollars			1990 Dollars		
	Control	Water Shortage	Percent Difference	Control	Water Shortage	Percent Difference	Control	Water Shortage	Percent Difference
1990	\$20.296	\$20.296	0.00%	\$34.038	\$34.038	0.00%	\$15,676	\$15,676	0.00%
1991	\$21.568	\$21.568	0.00%	\$35.437	\$35.437	0.00%	\$16,044	\$16,044	0.00%
1992	\$22.697	\$22.697	0.00%	\$36.422	\$36.422	0.00%	\$16,290	\$16,290	0.00%
1993	\$24.061	\$24.061	0.00%	\$37.813	\$37.813	0.00%	\$16,651	\$16,651	0.00%
1994	\$25.334	\$25.334	0.00%	\$39.474	\$39.474	0.00%	\$16,944	\$16,944	0.00%
1995	\$26.421	\$26.421	0.00%	\$42.225	\$42.225	0.00%	\$17,129	\$17,129	0.00%
1996	\$27.726	\$27.726	0.00%	\$44.703	\$44.703	0.00%	\$17,436	\$17,436	0.00%
1997	\$28.662	\$28.662	0.00%	\$46.514	\$46.514	0.00%	\$17,488	\$17,488	0.00%
1998	\$30.153	\$30.153	0.00%	\$48.122	\$48.122	0.00%	\$17,859	\$17,859	0.00%
1999	\$31.672	\$31.672	0.00%	\$50.576	\$50.576	0.00%	\$18,256	\$18,256	0.00%
2000	\$32.112	\$32.112	0.00%	\$52.911	\$52.911	0.00%	\$18,037	\$18,037	0.00%
2001	\$33.436	\$33.436	0.00%	\$54.600	\$54.600	0.00%	\$18,383	\$18,383	0.00%
2002	\$34.859	\$34.859	0.00%	\$56.435	\$56.435	0.00%	\$18,768	\$18,768	0.00%
2003	\$36.317	\$36.317	0.00%	\$58.316	\$58.316	0.00%	\$19,156	\$19,156	0.00%
2004	\$37.861	\$37.861	0.00%	\$60.316	\$60.316	0.00%	\$19,574	\$19,574	0.00%
2005	\$39.460	\$39.460	0.00%	\$62.433	\$62.433	0.00%	\$20,003	\$20,003	0.00%
2006	\$41.052	\$38.314	-6.67%	\$64.539	\$58.670	-9.09%	\$20,409	\$19,780	-3.08%
2007	\$42.574	\$38.618	-9.29%	\$66.428	\$59.443	-10.52%	\$20,760	\$20,188	-2.75%
2008	\$44.078	\$39.523	-10.33%	\$68.227	\$60.455	-11.39%	\$21,089	\$20,436	-3.10%
2009	\$45.606	\$40.439	-11.33%	\$70.068	\$61.516	-12.21%	\$21,415	\$20,730	-3.20%
2010	\$47.166	\$41.390	-12.24%	\$71.940	\$62.674	-12.88%	\$21,744	\$21,027	-3.30%
2011	\$48.984	\$42.569	-13.10%	\$73.905	\$63.945	-13.48%	\$22,212	\$21,461	-3.38%
2012	\$50.251	\$43.339	-13.76%	\$75.793	\$65.251	-13.91%	\$22,420	\$21,681	-3.30%
2013	\$51.802	\$44.353	-14.38%	\$77.684	\$66.577	-14.30%	\$22,748	\$22,011	-3.24%
2014	\$53.381	\$45.543	-14.68%	\$79.586	\$68.066	-14.47%	\$23,079	\$22,332	-3.23%
2015	\$54.926	\$46.682	-15.01%	\$81.392	\$69.398	-14.74%	\$23,393	\$22,636	-3.24%
2016	\$56.441	\$47.775	-15.35%	\$82.984	\$70.525	-15.01%	\$23,687	\$22,921	-3.24%
2017	\$58.019	\$48.953	-15.63%	\$84.813	\$71.909	-15.21%	\$24,002	\$23,237	-3.19%
2018	\$59.626	\$50.179	-15.84%	\$86.643	\$73.294	-15.41%	\$24,323	\$23,559	-3.14%
2019	\$61.238	\$51.801	-15.41%	\$88.412	\$74.668	-15.55%	\$24,639	\$24,044	-2.42%
2020	\$62.845	\$52.997	-15.67%	\$90.113	\$76.095	-15.56%	\$24,948	\$24,272	-2.71%
2021	\$63.964	\$53.849	-15.81%	\$91.185	\$77.145	-15.40%	\$25,063	\$24,326	-2.94%
2022	\$65.105	\$54.771	-15.87%	\$92.546	\$78.414	-15.27%	\$25,187	\$24,403	-3.11%
2023	\$66.607	\$56.095	-15.78%	\$94.158	\$79.847	-15.20%	\$25,457	\$24,661	-3.13%
2024	\$68.155	\$57.516	-15.61%	\$95.834	\$81.350	-15.11%	\$25,727	\$24,948	-3.03%
2025	\$69.702	\$58.971	-15.39%	\$97.422	\$82.974	-14.83%	\$26,000	\$25,251	-2.88%
2026	\$71.295	\$60.457	-15.20%	\$99.085	\$84.410	-14.81%	\$26,285	\$25,564	-2.75%
2027	\$72.919	\$61.975	-15.01%	\$100.734	\$85.821	-14.80%	\$26,576	\$25,892	-2.57%
2028	\$74.561	\$63.552	-14.76%	\$102.319	\$87.238	-14.74%	\$26,868	\$26,235	-2.35%
2029	\$76.242	\$65.096	-14.62%	\$103.961	\$88.764	-14.62%	\$27,169	\$26,555	-2.26%
2030	\$77.935	\$66.620	-14.52%	\$105.522	\$91.089	-13.68%	\$27,470	\$26,633	-3.05%
2031	\$79.685	\$68.216	-14.39%	\$107.157	\$93.208	-13.02%	\$27,817	\$26,744	-3.86%
2032	\$81.487	\$69.893	-14.23%	\$108.791	\$95.600	-12.12%	\$28,170	\$27,053	-3.97%
2033	\$83.317	\$72.260	-13.27%	\$110.360	\$96.618	-12.45%	\$28,528	\$27,629	-3.15%
2034	\$85.224	\$74.698	-12.35%	\$112.010	\$98.373	-12.17%	\$28,894	\$28,209	-2.37%
2035	\$87.199	\$76.757	-11.97%	\$113.666	\$100.052	-11.98%	\$29,266	\$28,624	-2.20%

Part V

The Impact of Constructing Water Projects

on Rural Nevada

In this section we simulate the economic impact of constructing proposed water delivery systems on the economies of rural Clark, Nye, Lincoln, and White Pine Counties. Our simulations will include the effects of construction (entered into the model as expenditure on a water delivery system) and employment at the pumping stations (treated as employment in transportation and public utilities). Data used in this study are based on information provided by the Las Vegas Valley Water District. Expenditures for construction for each year from 2004 through 2035¹ were entered for the sum of counties. (See Table 5.1). Beginning in 2008, we simulated the hiring of operating employees (which reach 260 when all water delivery systems are completed, except of Nye County, which will begin operation in 2036, which is beyond the scope of the model). The scenario presents a water system of 250,000 acre-feet per year by the year 2036.

The proposed Las Vegas Valley Water District construction plans call for expenditures in Lincoln, Nye, White Pine Counties and rural Clark County over a long time. These plans remain tentative as to expenditure allocations by year and location. Nevertheless, the expenditures shown in Table 5.1 offer an illustrative accounting for the proposed project.

The Las Vegas Valley Water District proposal stipulates expenditures for different counties in various years. It is our understanding that this breakdown is

¹ The current version of the Nevada Regional Models extends only to the year 2035. Therefore, construction and operation expenditures for the years 2036 and 2037 could not be forecast.

tentative. Accordingly, we aggregated rural Clark, Nye, Lincoln and White Pine Counties into the *rural Nevada* region. This aggregation allows us to include inter-county economic effects that would have been lost had we treated all expenditures on a county-by-county basis.

The actual breakdown of construction expenditure and operating employment for the four-county water projects is provided on the second page of Table 5.1. The variability of expenditure occurs because of the overlap in expenditures in different counties. The stair-step nature of operating employment results from the assumption that no operating employment occurs until each project is completed.

Table 5.2 contrast the employment, income, and output consequences of the expenditure and employment simulations shown in Table 5.1. Each year contrasts the consequences of simulating a water shortage in Clark County with the consequences of constructing and operating rural water pumping stations. The difference between the water project and water shortage outcomes are shown in both levels and percentages.

We find that in 2004, total employment in the rural areas would be increased by 143, as construction began in rural Clark County. By 2009, when the first phase of the water projects would be completed, 1,518 additional jobs would be attributed to the water projects. The employment impact of the water projects peaks in 2022, when 3,863 more workers would be employed in rural Nevada than would be the case were a water shortage allowed to occur in Clark County.

The population effects of rural water projects parallel the employment impacts. Between 2004 and 2035, population impacts due to the water projects ranges from 293 in 2004 to 6,991 in 2035. The percentage difference in population with and without the water projects would peak in 2022 when population would be 2.7% higher with the water projects. Sixteen million dollars in additional disposable personal income would be attributed to water projects in 2004. By 2022, rural Nevadans would have \$146 million more in spendable income (in 1990 dollars) than they would have if a water shortage struck Clark County. Higher income stems from greater economic activity; by 2035, rural Nevada would produce \$352 million more output because of the water projects. Note that income and population gains are roughly the same two to three percent, which causes only minor changes in per capita income. According to an expert on the Nevada Regional Model, migrants are more likely to be children than are current residents². While per capita income might eventually decline slightly due to water projects, average household income would increase due to the construction and operation of the water projects.

² As shown in Table 5.2, the ratio of population to employment in 2035 is 1.812 with a water shortage. The change in population divided by the change in employment attributed to water projects is 2.095.

Table 5.1

EXPENDITURE BREAKDOWN BY COUNTY (a)
LVVWD DEPARTMENT OF RESOURCES

November 2, 1992

250,000 AFY

Years	2018-2024	2032-2037	2012-2020	2004-2011	
County	White Pine	Nye	Lincoln	Clark	Total
Total Design and Construction Cost	\$261,930	\$338,802	\$734,885	\$712,782	\$2,048,399
Out-of-State Purchases	\$136,914	\$228,591	\$479,985	\$429,221	\$1,274,711
Labor, Materials, Equipment Provided In-State	\$125,016	\$110,211	\$254,900	\$283,561	\$773,688
Year Operations Begin	2023	2036	2015	2008	
Operations Staff	30	40	90	140	300
Annual Total Operations and Maintenance (b)	\$5,590	\$6,830	\$5,743	\$12,932	\$31,095
Out-of-State Purchases	\$896	\$1,094	\$920	\$2,210	\$5,120
Labor, Materials Equipment Provided In-State	\$4,694	\$5,736	\$4,823	\$10,722	\$25,975

Note: (a) All costs are in thousands of 1990 dollars

(b) Operation and maintenance costs do not include the salaries of administrative and technical staff, and field crews.

Table 5.1 (concluded)

Annual Construction Expenditures, Rural Nevada

Year	Construction Expenditures (millions of 1990 Dollars)	Operating Expenditure (millions of 1990 Dollars)	Operating Employment (thousands)
1997	\$0.000	\$0.000	0.000
1998	\$0.000	\$0.000	0.000
1999	\$0.000	\$0.000	0.000
2000	\$0.000	\$0.000	0.000
2001	\$0.000	\$0.000	0.000
2002	\$0.000	\$0.000	0.000
2003	\$0.000	\$0.000	0.000
2004	\$35.445	\$0.000	0.000
2005	\$35.445	\$0.000	0.000
2006	\$35.445	\$0.000	0.000
2007	\$35.445	\$0.000	0.000
2008	\$35.445	\$10.722	0.140
2009	\$35.445	\$10.722	0.140
2010	\$35.445	\$10.722	0.140
2011	\$35.445	\$10.722	0.140
2012	\$28.322	\$10.722	0.140
2013	\$28.322	\$10.722	0.140
2014	\$28.322	\$10.722	0.140
2015	\$28.322	\$15.545	0.230
2016	\$28.322	\$15.545	0.230
2017	\$28.322	\$15.545	0.230
2018	\$46.182	\$15.545	0.230
2019	\$46.182	\$15.545	0.230
2020	\$46.182	\$15.545	0.230
2021	\$17.859	\$15.545	0.230
2022	\$17.859	\$15.545	0.230
2023	\$17.859	\$20.239	0.260
2024	\$17.859	\$20.239	0.260
2025	\$0.000	\$20.239	0.260
2026	\$0.000	\$20.239	0.260
2027	\$0.000	\$20.239	0.260
2028	\$0.000	\$20.239	0.260
2029	\$0.000	\$20.239	0.260
2030	\$0.000	\$20.239	0.260
2031	\$0.000	\$20.239	0.260
2032	\$18.369	\$20.239	0.260
2033	\$18.369	\$20.239	0.260
2034	\$18.369	\$20.239	0.260
2035	\$18.369	\$20.239	0.260

Table 5.2
Impact of Water Projects on Rural Nevada

Year	Government Employment			Total Employment			Population		
	Thousands of People			Thousands of People			Thousands of People		
	Water Shortage	Water Projects	Percent Difference	Water Shortage	Water Projects	Percent Difference	Water Shortage	Water Projects	Percent Difference
1990	8.815	8.815	0.00%	92.389	92.389	0.00%	148.631	148.631	0.00%
1991	9.003	9.003	0.00%	93.836	93.836	0.00%	152.515	152.515	0.00%
1992	9.206	9.206	0.00%	95.288	95.288	0.00%	156.229	156.229	0.00%
1993	9.484	9.484	0.00%	96.445	96.445	0.00%	160.864	160.864	0.00%
1994	9.732	9.732	0.00%	98.997	98.997	0.00%	165.251	165.251	0.00%
1995	9.873	9.873	0.00%	101.877	101.877	0.00%	168.250	168.250	0.00%
1996	10.004	10.004	0.00%	104.273	104.273	0.00%	170.737	170.737	0.00%
1997	10.239	10.239	0.00%	105.963	105.963	0.00%	173.736	173.736	0.00%
1998	10.487	10.487	0.00%	106.885	106.885	0.00%	177.205	177.205	0.00%
1999	10.690	10.690	0.00%	108.779	108.779	0.00%	179.810	179.810	0.00%
2000	10.891	10.891	0.00%	112.894	112.894	0.00%	182.698	182.698	0.00%
2001	11.125	11.125	0.00%	114.287	114.287	0.00%	186.253	186.253	0.00%
2002	11.339	11.339	0.00%	115.839	115.839	0.00%	189.444	189.444	0.00%
2003	11.558	11.558	0.00%	117.477	117.477	0.00%	192.695	192.695	0.00%
2004	11.774	11.792	0.15%	119.164	119.307	0.12%	195.881	196.174	0.15%
2005	11.992	12.022	0.25%	120.933	121.187	0.21%	199.067	199.564	0.25%
2006	12.210	12.257	0.38%	122.310	122.659	0.29%	202.311	203.002	0.34%
2007	12.426	12.495	0.55%	123.108	123.600	0.40%	205.548	206.453	0.44%
2008	12.643	12.750	0.84%	123.422	124.611	0.96%	208.634	210.172	0.74%
2009	12.865	13.002	1.06%	124.061	125.579	1.22%	211.729	213.795	0.97%
2010	13.085	13.250	1.26%	124.680	126.528	1.47%	214.834	217.337	1.16%
2011	13.305	13.496	1.43%	125.671	127.771	1.66%	217.884	220.790	1.33%
2012	13.523	13.733	1.55%	126.642	128.930	1.79%	220.873	224.073	1.44%
2013	13.739	13.969	1.66%	127.599	130.081	1.92%	223.771	227.279	1.56%
2014	13.954	14.201	1.76%	128.561	131.195	2.02%	226.609	230.384	1.65%
2015	14.158	14.434	1.93%	129.501	132.361	2.18%	229.205	233.428	1.83%
2016	14.361	14.663	2.08%	130.421	133.446	2.29%	231.740	236.364	1.98%
2017	14.563	14.886	2.20%	131.328	134.505	2.39%	234.189	239.145	2.10%
2018	14.764	15.118	2.37%	132.224	135.608	2.52%	236.549	241.982	2.27%
2019	14.965	15.344	2.50%	133.117	136.668	2.63%	238.843	244.657	2.41%
2020	15.166	15.568	2.62%	133.992	137.673	2.71%	241.061	247.224	2.53%
2021	15.366	15.788	2.71%	135.134	138.929	2.76%	243.200	249.655	2.62%
2022	15.567	16.005	2.78%	136.182	140.045	2.79%	245.249	251.956	2.70%
2023	15.767	16.207	2.75%	137.234	141.048	2.74%	247.220	253.935	2.68%
2024	15.968	16.416	2.76%	138.267	142.079	2.71%	249.141	255.946	2.69%
2025	16.170	16.614	2.70%	139.274	143.011	2.64%	250.986	257.713	2.64%
2026	16.377	16.819	2.66%	140.279	143.923	2.56%	252.817	259.492	2.60%
2027	16.587	17.029	2.63%	141.245	144.817	2.49%	254.653	261.311	2.58%
2028	16.799	17.243	2.60%	142.187	145.714	2.44%	256.436	263.075	2.55%
2029	17.013	17.459	2.58%	143.082	146.583	2.41%	258.175	264.814	2.53%
2030	17.231	17.679	2.56%	143.960	147.445	2.38%	259.880	266.536	2.52%
2031	17.458	17.905	2.52%	144.846	148.267	2.33%	261.625	268.272	2.50%
2032	17.691	18.150	2.55%	145.779	149.162	2.29%	263.432	270.219	2.54%
2033	17.927	18.394	2.57%	146.664	150.024	2.26%	265.228	272.092	2.55%
2034	18.167	18.642	2.58%	147.506	150.856	2.24%	266.994	273.937	2.56%
2035	18.409	18.890	2.57%	148.321	151.658	2.22%	268.723	275.714	2.56%

Table 5.2 (continued)
Impact of Water Projects on Rural Nevada

Year	Personal Disposable Income			Gross Regional Product			Per Capita Income		
	Billions of 1990 Dollars			Billions of 1990 Dollars			1990 Dollars		
	Water Shortage	Water Projects	Percent Difference	Water Shortage	Water Projects	Percent Difference	Water Shortage	Water Projects	Percent Difference
1990	\$2.128	\$2.128	0.00%	\$3.875	\$3.875	0.00%	\$14,321	\$14,321	0.00%
1991	\$2.217	\$2.217	0.00%	\$3.968	\$3.968	0.00%	\$14,534	\$14,534	0.00%
1992	\$2.298	\$2.298	0.00%	\$4.036	\$4.036	0.00%	\$14,709	\$14,709	0.00%
1993	\$2.392	\$2.392	0.00%	\$4.135	\$4.135	0.00%	\$14,873	\$14,873	0.00%
1994	\$2.506	\$2.506	0.00%	\$4.339	\$4.339	0.00%	\$15,166	\$15,166	0.00%
1995	\$2.577	\$2.577	0.00%	\$4.526	\$4.526	0.00%	\$15,317	\$15,317	0.00%
1996	\$2.640	\$2.640	0.00%	\$4.639	\$4.639	0.00%	\$15,461	\$15,461	0.00%
1997	\$2.680	\$2.680	0.00%	\$4.748	\$4.748	0.00%	\$15,423	\$15,423	0.00%
1998	\$2.772	\$2.772	0.00%	\$4.847	\$4.847	0.00%	\$15,644	\$15,644	0.00%
1999	\$2.874	\$2.874	0.00%	\$5.006	\$5.006	0.00%	\$15,986	\$15,986	0.00%
2000	\$2.935	\$2.935	0.00%	\$5.393	\$5.393	0.00%	\$16,065	\$16,065	0.00%
2001	\$3.031	\$3.031	0.00%	\$5.514	\$5.514	0.00%	\$16,274	\$16,274	0.00%
2002	\$3.131	\$3.131	0.00%	\$5.653	\$5.653	0.00%	\$16,527	\$16,527	0.00%
2003	\$3.237	\$3.237	0.00%	\$5.804	\$5.804	0.00%	\$16,800	\$16,800	0.00%
2004	\$3.351	\$3.367	0.50%	\$5.963	\$6.011	0.81%	\$17,105	\$17,165	0.35%
2005	\$3.467	\$3.483	0.44%	\$6.132	\$6.174	0.70%	\$17,418	\$17,451	0.19%
2006	\$3.573	\$3.594	0.56%	\$6.170	\$6.322	2.41%	\$17,663	\$17,702	0.22%
2007	\$3.665	\$3.695	0.81%	\$6.287	\$6.445	2.46%	\$17,830	\$17,896	0.37%
2008	\$3.759	\$3.815	1.47%	\$6.402	\$6.650	3.80%	\$18,018	\$18,150	0.73%
2009	\$3.854	\$3.914	1.54%	\$6.520	\$6.767	3.72%	\$18,203	\$18,305	0.56%
2010	\$3.951	\$4.016	1.65%	\$6.641	\$6.893	3.72%	\$18,389	\$18,478	0.48%
2011	\$4.050	\$4.121	1.75%	\$6.779	\$7.036	3.71%	\$18,588	\$18,667	0.42%
2012	\$4.150	\$4.224	1.76%	\$6.917	\$7.168	3.56%	\$18,788	\$18,850	0.33%
2013	\$4.250	\$4.330	1.86%	\$7.055	\$7.310	3.55%	\$18,992	\$19,051	0.31%
2014	\$4.352	\$4.437	1.95%	\$7.194	\$7.454	3.54%	\$19,203	\$19,261	0.30%
2015	\$4.452	\$4.556	2.31%	\$7.333	\$7.652	4.26%	\$19,424	\$19,520	0.49%
2016	\$4.554	\$4.662	2.34%	\$7.472	\$7.789	4.15%	\$19,650	\$19,723	0.37%
2017	\$4.657	\$4.770	2.41%	\$7.613	\$7.931	4.09%	\$19,884	\$19,947	0.32%
2018	\$4.761	\$4.890	2.68%	\$7.752	\$8.102	4.42%	\$20,126	\$20,209	0.41%
2019	\$4.867	\$5.000	2.69%	\$7.893	\$8.243	4.34%	\$20,377	\$20,436	0.29%
2020	\$4.974	\$5.112	2.73%	\$8.034	\$8.385	4.29%	\$20,634	\$20,677	0.21%
2021	\$5.084	\$5.226	2.75%	\$8.190	\$8.543	4.21%	\$20,906	\$20,934	0.13%
2022	\$5.194	\$5.340	2.76%	\$8.344	\$8.693	4.10%	\$21,180	\$21,194	0.06%
2023	\$5.305	\$5.438	2.46%	\$8.495	\$8.802	3.55%	\$21,460	\$21,414	-0.21%
2024	\$5.418	\$5.561	2.59%	\$8.644	\$8.981	3.82%	\$21,746	\$21,726	-0.09%
2025	\$5.532	\$5.664	2.35%	\$8.792	\$9.097	3.41%	\$22,041	\$21,979	-0.28%
2026	\$5.648	\$5.784	2.37%	\$8.940	\$9.248	3.39%	\$22,342	\$22,291	-0.23%
2027	\$5.766	\$5.905	2.37%	\$9.087	\$9.397	3.36%	\$22,643	\$22,598	-0.20%
2028	\$5.886	\$6.028	2.37%	\$9.234	\$9.546	3.33%	\$22,954	\$22,913	-0.18%
2029	\$6.008	\$6.152	2.36%	\$9.380	\$9.694	3.29%	\$23,272	\$23,233	-0.17%
2030	\$6.133	\$6.279	2.34%	\$9.527	\$9.842	3.27%	\$23,600	\$23,557	-0.18%
2031	\$6.262	\$6.409	2.30%	\$9.673	\$9.990	3.22%	\$23,937	\$23,888	-0.20%
2032	\$6.395	\$6.556	2.48%	\$9.820	\$10.174	3.55%	\$24,274	\$24,260	-0.06%
2033	\$6.530	\$6.690	2.42%	\$9.969	\$10.319	3.47%	\$24,619	\$24,587	-0.13%
2034	\$6.667	\$6.829	2.39%	\$10.117	\$10.467	3.42%	\$24,970	\$24,927	-0.17%
2035	\$6.805	\$6.969	2.37%	\$10.266	\$10.618	3.39%	\$25,325	\$25,276	-0.19%

Summary

This study investigated alternative paths for the Las Vegas Valley economy, first, with adequate water supplies, and, second, under water-shortage conditions. Unless water shortages can be averted, the Las Vegas economy will undergo severe employment and income constrictions, leading to pathologies such as higher crime, increased taxes, and the forced outmigration of Nevada youth.

Taking into account the unique growth stimuli from senior-citizen migration, casino and hotel construction, and improvements in infrastructure, we developed in Part I control forecasts of the regional economies of Nevada. We found that if the Las Vegas economy is allowed to grow to natural maturation, employment and population of each area will approximately double between 1990 and 2035 with state's per capita real income increasing by more than eighty-six percent.

Part II presents a cross-section analysis of long-term growth patterns on social and economic well-being. We investigated 79 variables in 312 metropolitan areas in the period 1980 through 1984. We found that cities that had abruptly gone from rapid growth to negative growth, as would be the case for Las Vegas under imposed water-shortage conditions, had the highest unemployment, the lowest housing values, the smallest employment in government, the highest property tax rates, and the least building activity. In short, were growth in Las Vegas to give way to rapid decline, Las Vegas residents could expect a marked deterioration in the quality of life.

In Part III the performance of sectors of the Las Vegas economy over the period 1970 through 1989 were studied. Specifically, we identified the most growth-sensitive sectors of the Las Vegas economy: construction, finance, insurance and real estate, manufacturing, retail trade, and state-local government.

Moreover, the hospitality industry dominates the region's export base. Furthermore, total employment and per capita disposable income both declined for two years during the 1979 - 1983 recession. Thus, historical evidence indicates that the Las Vegas economy exhibits above-average sensitivity to reductions in growth.

In Part IV we simulated the impact of water-shortage-imposed growth limitations on the Las Vegas economy. Assuming a water shortage caused an abrupt cessation of growth in 2006, we predicted a sixty percent decline in construction employment in 2006; by 2007, construction employment would be nearly seventy percent less than it would have been with plentiful water. Finance, insurance and real estate, retail trade, wholesale trade, and government would eventually fall by approximately nineteen percent below where they would have been with plentiful water. The completion of hotel construction would eventually cause service employment to fall eighteen percent below its control forecast. Overall, a water shortage would cause employment and population to fall to low points of nineteen and twenty percent below control levels.

Both total disposable income and total output (real gross regional product) would fall behind their potentials by nearly twenty-four percent. After the water shortage, the average Clark County resident would suffer about \$900 per year in lost income.

While less severe, the rest of the state of Nevada would experience economic dislocations because of a Las Vegas Valley water shortage. Furthermore, a decline in Las Vegas income and employment would strain the state's fiscal affairs, and its unemployment compensation system would be severely affected. In addition, employment in Nye and Lincoln Counties would both decline by about five percent below potential, blunting population and income growth. As a result, residents of these two counties would lose an estimated \$250 per person per year in income.

In Part V we predict that water projects designed to bring water from rural areas of southern Nevada to the Las Vegas Valley would have substantial positive effects on the counties involved. These effects include those from construction and operation of the system and the derived effects from the additional growth of Las Vegas made possible by that system. By the year 2009, employment attributable to the water projects would equal 1,518, peaking in 2022 with 3,863 workers. Population increases due to the water projects would reach 6,991 in 2035. Increases in rural personal income from the project would peak in 2022 and would exceed \$146 million (in 1990 dollars).